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REVIEW OF SCIENCE AND INDUSTRY,

A MONTHLY RECORD OF PROGRESS IN

SCIENCE, MECHANIC ARTS AND LITERATURE.

VOL. VIII. NOVEMBER, 1884. NO. 7.

GEOGRAPHY.

THE TERRITORY OF WASHINGTON.

R. J. MC CARTY.

The Cascade Mountains running nearly parallel to the Pacific Coast and about 100 miles from it, divide the Territory into two parts. The eastern moiety, known as "Eastern Washington," is, generally speaking, a high, rolling prairie, through which winds the great Columbia and Snake Rivers, and which, from their tortuous courses and their many branches of running water, make it an exceedingly well watered region, excellently adapted to pastoral purposes. The soil is formed from the decomposition of volcanic deposits *in situ*, and is deep, rich, and easily pulverized. The smaller cereals can be produced in great abundance, but corn will not thrive, owing to the dry summer and cool nights; however, since this valuable cereal has often shown a willingness to adapt itself to uncongenial conditions elsewhere, it may yet become sufficiently acclimated by experiment. An effort is now being made in this direction, which, if successful, will greatly enhance the agricultural importance of the Territory.

The one thing which the Territory of Washington needs is a railroad line from Puget Sound across the Cascade Range in the direction of Walla Walla,—and, though the people have all along realized this, though they have planned, struggled, and almost wept for it, they have so far been defeated by the policy of the Northern Pacific Railroad Co.

Congress, by Act of July 2, 1864, and subsequent acts amendatory, author-

ized the Northern Pacific Railroad Company to construct a railroad from Lake Superior to Puget Sound, with a branch, *via* the valley of the Columbia, to Portland, Oregon,—and to aid the enterprise granted to the company forty alternate sections of land to the mile. On April 10, 1869, authority was granted for extending the Columbia River branch to Puget Sound, to connect with the main line, which was then to be built across the Cascade Mountains, and it was specified that no land or other subsidy should be given for this extension of the branch line. By some means Congress was prevailed upon afterwards to declare the Columbia River line the main stem and the Cascade line the branch, so that the grant was thus made to cover both.

This was all done by Congress with the proviso that the lines should be built by July 4, 1879. Since the "Cascade Branch" has not yet been built and the Columbia River line is not finished, connection being made over the O., R. & U. Co.'s line from Wallula to Kalama, it is claimed by the people that the land grant is forfeited. Yet such is the anxiety for a railroad across the Cascades that many are against forfeiture if the company will build the line in three years—yet again many are in favor of unconditional forfeiture. The former comprise the "railroad," the latter the "anti railroad" party. This is the main issue in the present electoral campaign. The anti-railroad party is in the majority, but since old party-lines are still drawn tightly, and since the republicans have nominated a railroad and the democrats an anti-railroad ticket, it is a kind of a quadrangular fight, with nobody in particular yet on top.

That portion of Washington Territory west of the Cascade Mountains is divided by local geographers into two parts. The region drained by the streams which flow directly into Puget Sound is called the "Sound Country," the remainder is known as "Western Washington." Of this last, all that portion lying west of the meridian through Victoria, B. C., and north of the parallel of latitude through Tacoma, having an area of 3,300 square miles, is an inhospitable wilderness of ragged mountains, and can therefore never be of great political or commercial importance. Still it will forever furnish unmistakable landmarks to the navigator and will always fill the poetical office of diversifying and rendering sublime the otherwise beautiful landscape.

As seen from Seattle nothing can exceed the modest sublimity of these mountains. They have not those round spiritless summits, that hog-back aspect, suggesting the idea of a huge pile of dirt, so common with other mountains of similar height; nor do they overwhelm one with their loftiness. Their summits stand out sharp and clear against the sky, like a cluster of giant pyramids, and, though the glittering crust of distant Ranier shoots far above them, they seem to gain, not suffer, by the contrast.

The remaining portion of Western Washington is much the same as to soil and topographical configuration as the "Sound Country." As has been said, the "Sound Country" lies adjacent to and comprehends that archipelago known as Puget Sound. This name, in honor of one of Vancouver's lieutenants, was originally given to that body of water adjacent to Olympia, Steilacoom, and Ta-

coma; but in time its meaning was made to comprehend all that body of water which penetrates the land in all directions from the eastern end of Fuca's Strait.

If one were required to make an ideal map of a country which would offer the greatest facilities for water transportation at the least expense of dry land, he could do no better than copy the map of Puget sound. The area of the "Sound Country" is about the same as that of the State of Massachusets, three-quarters of which is land and one-quarter water. About one-third of the land is situated on the slopes of the rivers and streams running into the Sound. In any portion of the remaining part it is difficult to find a point further than six miles from deep water.

In fact, Puget Sound may be likened unto a broad deep river returning upon itself, intersecting itself, and throwing out branches often and again. One of the peculiarities of this body of water is its great depth and another is the want of anything like a beach, the largest ships being able to run within a few feet of the shore almost everywhere with perfect safety. While this is excellent in meeting the important requirement of keeping ships afloat, it works mischief when it is desired to keep them from floating off, for the Sound is so deep in most places and quite near the shore that it is difficult to get anchorage.

Another peculiarity of this contorted stream which grows out of its peculiar shape, is the motion of the water under tidal action. The tide of course is due entirely to the momentum of the tidal wave which covers up the Strait of Fuca. By reason of the obstructions which it meets and of the distance it has to travel, the tide wave in the Sound is unable to connect with the ebb and flow at the Strait, so that at various points in the Sound it often happens that two or more tide waves meet with great violence, forming a tremendous convulsion of waters, which, while not at all dangerous to the larger craft, makes it hazardous to venture out in some localities in small boats.

From the above it will be seen that the Sound Country is, perhaps, possessed of the finest natural transportation facilities on the globe.

Howsoever great may be the natural resources of any region it avails nothing unless these resources be accessible and marketable. And since labor is the foundation of all wealth, and since man must be assured of subsistence and safety before he can work, and must be able to barter the product of his labor before he will, it is impossible to develop any country without adequate transportation facilities. It is to this principle that the railroad owes that power and importance which has enabled it to extend the bounds of civilization in the interest of enlightened society and to the confusion of the naked savage. When therefore a habitable region is found in which nature has built innumerable highways, requiring no repair and ready for equipment, it is safe to predict prosperity, even if natural wealth is limited.

The natural wealth of the "Sound Country" is both great and diverse. Though the highlands are rough and broken and not so well adapted to agriculture as are the prairies of Illinois, they are covered by a forest, an accurate account of which would appear fabulous, such is the number and size of its deni-

zens. The fact is, the occasion for testing the agricultural worth of these highlands has not yet arisen and no one yet knows whether they have any value aside from the timber which covers them. The reasons for this are the great cost of removing the monstrous stumps and the comparative ease with which the valley lands can be cleared.

These valley lands are fully as rich as any in the States, and are admirably adapted to hop-growing, which is the principal agricultural industry. Although but a small portion of these lands were under cultivation in 1880, this Territory ranked fourth among hop-growing States, having been surpassed only by New York, Wisconsin and California. The average crop of hops is about 2,000 pounds to the acre. The cost of producing and preparing for market is about eleven cents per pound, and the market price will average about twenty-one cents. This gives a net return of $200 per acre. Such lands are held at from $100 to $125 per acre, which, judging from results, is not too high.

The trees which cover the highlands are mostly fir and cedar, while the valleys nourish maple, ash, elder, willow, and a little oak, though practically there is no hard wood timber in the country.

Along the eastern shore of the Sound there are vast deposits of coal. Lignite of a good quality forms the bulk, though there is some bituminous. Whether there are any deposits which deserve the name of anthracite is yet problematical. Again, it is claimed, and it is no doubt true, that large deposits of iron ore of excellent quality can be found on the western slope of the Cascades.

The climate of the "Sound Country" is remarkably equable as to temperature, and almost entirely free from atmospheric disturbances of any kind. Thunder and lightning are strangers in the land, and howling winds unknown. Even brisk winds are rare. There is, however, usually a smooth, soft breeze stirring which enables the sailing craft on the Sound to navigate, and which adds greatly to the pleasurable climate.

About the first of April the dry season begins, which lasts until about the first of November. During this period the wind is usually from the northwest; occasionally it shifts to the south and when it does the weather becomes cool and damp, the low temperature produced by the Cascade Mountains causing the dampness.

The air is always laden with moisture and when from any cause the temperature gets below about 45° F. it becomes damp; on the contrary, any cause which keeps up the thermometer will keep the weather dry. Now, since there are no winds worth mentioning, there is no chance to vary the temperature with air from other regions, so that it may be assumed that the climate depends wholly upon the position of the Sun. About the first of November the position of the Sun changes the temperature of the air and brings it to or below the dew point, causing fog or rain for the most of the time until the first of April.

This condition of almost constant dampness is not so unpleasant as one would at first suppose; for there is hardly ever a violent precipitation, the average rain being more like a dense fog which does not readily penetrate the cloth-

ing, but remains on the surface much after the manner of snow. Besides the mist falls vertically and is easily kept off by an umbrella which a man can hold over him without freezing his hands off. It always did seem a waste of labor and fortitude for a person to struggle with freezing hands to keep an umbrella over him in a howling blast of horizontal rain. It is much more sensible to put one's hands in one's pockets and hurry home.

Happily it is not necessary to do either here. During the summer the thermometer rarely reaches 80° F. and the cool nights are highly conducive to sleep. During the winter, while water rarely freezes, the excessive moisture makes the cold much more sensible than an equal temperature elsewhere. Notwithstanding this, everybody is satisfied with the climate; so much so, indeed, that once here no one wants to leave, or having left there is no one but wants to get back. It is even true that some do not like to go away on a visit for fear they won't get back.

A slight change of position makes a great difference in climate in this region, for though the above outlines the climate of the Sound, it does not apply to that of Eastern Washington, which is, however, much more equable than that of any of the States east of the Rocky Mountains. So that with rich land, inexhaustible quantities of timber, coal, and iron, all easy of access independently of railroad construction, it does not require a prophet to see that this same "Sound Country" is destined soon to become one of the richest and most prosperous of regions, as it is now one of the most pleasant.

The white man in his westward journey around the earth seems to have here reached the jumping-off place and to have been compelled to mingle with the poor savage whom he could drive no further.

The Indians of Puget Sound belong to the nation of Flatheads, a name derived from their practice of "flattening" the heads of their young. They bind the child, on its back, firmly to a board with many thongs, one of which passes over the forehead which is protected by a pad. This pad they press from time to time and thus gradually outrage nature. The effect of this operation is to depress the forehead, make more prominent the high cheek bones, elongate the head, broaden and flatten the lower part of the face, and to effectually stamp out every lineament of beauty or intelligence. They are such thieves that some merchants will not admit them unless they have some idle clerks to watch them, preferring the loss of their profit to a total loss.

There are many different tribes of these Flathead Indians, and each tribe has a language of its own. In order to remove the obstacles to trade which this confusion of tongues engendered, the Jesuits many years ago, in the interest of the Hudson Bay Company, made up a compound of all the languages and by introducing a tincture of French, originated what is known as the "Chinook Jargon," or "Indian trade language of the North Pacific Coast," which is now spoken by all the various tribes.

This language contains 493 words, from which the letter "r" is religiously excluded, which seems to indicate that the Flathead can no more pronounce that

letter than can his Mongolian brother, whom he resembles in more respects than this, but whom he hates with all the acrimony of his benighted soul.

For the benefit of those sufficiently curious, the Lord's Prayer in Chinook is subjoined:

Nesika Papa klaksta mitlite kopa saghalie kloshe kopa nesika tumtum
Our Father who stayeth in the above good in our hearts
mika nem; kloshe mika tyee kopa kouaway tilikum; kloshe mika tumtum
(be) thy name; good thou chief among all people; good thy will
kopa illahie, kahlua kopa saghalie. Potlaeth kouaway sun nesika muckamuck.
upon earth, as in the above. Give every day our food.
Spose nesika mamoak masahchie, wake mika hyas solleks, pe spose klaksta
If we do ill, (be)not thou very angry, and if anyone
masahchie kopa nesika wake nesika solleks kopa klaska. Mahsh siah
evil towards us not we angry towards them. Send away far
kopa nesika kouaway mesahchie. Kloshe kahkwa.
from us all evil. Good so.

The canoe is to the Sound Indian what the mustang is to the wiid Comanche. These canoes are dug out of cedar logs and are remarkable for grace and symmetry. The swiftness with which they can be driven through the water by a single oar, or rather paddle, is surprising and suggests the idea that the instinct of the Indian is, perhaps, as good a guide in shaping boats as the formulated experience of science.

The Sound Indian, or "Si-Wash," as he is called in local parlance, is a docile and useful member of society. He fills nearly the same place here as the negro does in the south. His principal avocation when not at work on the farms, is that of a fisherman, at which, owing to the immense quantity of raw material and his high degree of skill, he is a pre-eminent success. The waters swarm with fish,—the Sound with salmon, rock-cod, tom-cod, halibut, smelt, flounder and others, and the streams with the vigorous mountain trout. It is a disgrace to go fishing and return empty-handed. The "Si-Wash" is therefore indispensable to the honor of the unlucky sportsman.

The presence of the Chinaman here teaches that virtue much abused may be transformed to vice, and that there is iniquity in the too liberal application of the generous principles of our government. It is to be fervently hoped that statesmen will profit by the terrible mistake of ever allowing these leprous creatures to inundate our shores. The restriction act has only checked the malady, not cured it, and even now complaint is made that it does not restrict. Chinese have been known to get through by hiding in the wheel-houses of steamers, a fact which speaks well both of the reputation of our country in China and of the celestial determination to get here.

Everybody knows that the Territorial Legislature last year granted women the right to vote. It is claimed that the bill was traded, sprung upon the assembly in an unguarded moment, and passed against the sense of the majority. However that may be it became a law November 23, 1883. The law defining the qualifications of voters originally read:

"All American male citizens above the age of twenty-one years, and all American male half-breeds over that age, who have adopted the habits of the whites, and all other male inhabitants of this Territory above that age 'who shall "have declared on oath their intentions to become citizens, at least six months "previous to the day of election, and shall have taken an oath to support the "constitution of the United States and the organic act of this Territory, at least "six months previous to the day of election, and who shall have resided six "months in the Territory and thirty days in the county next preceding the day "of election, and none other, shall be entitled to hold office or vote at any elec-"tion in this Territory."

This was amended by an act approved November 23, 1883, to read as above with the word "male" stricken out, and thus was the political distinction of sex obliterated.

The law in regard to the qualifications of jurors reads thus: "All qualified "electors shall be competent to serve as petit jurors and all qualified electors and "householders shall be competent to serve as grand jurors within the county in "which they reside and within any county or district to which such county may "attached for judicial purposes."

At the spring meeting of the Board of County Commissioners the venire for grand and petit jurors are made from the tax list. It is true that nothing in the above compels the board to place women on either venire and it seems that certain influences were brought to bear to exclude them. The probable objections being that jurors are already sufficiently uncertain, that impaneling women would make them absolutely precarious; that men and women don't view things alike, and that the lawyer would be apt while convincing one part to lose his case with the other; that woman by reason of her peculiar duties and conditions was not fit to be a juror; that the association was in some cases improper, the testimony unchaste, and that she would try to enforce impracticable ideas of morality. These objections and many others too numerous to be known would probably have had their effect had not Judge Greene of this third judicial district notified the board that he would quash any venire which did not include a fair proportion of women.

Judge Greene is a most excellent gentleman, an able judge, and an ardent advocate of woman's rights. He proposes to give the experiment a fair trial, and to that end to push its application to the furthest consistent limit; and, on the principle that it is in the end best to enforce a law whether good or bad, he is perfectly right, and judging from the character of the man he would do the same thing if he happened to hold other views. Thus it happens that women must sit on juries. at least in this district. This seems to have created a change of heart on the part of some of the whilom advocates of the measure, and the opposition are even now agitating for repeal.

At best the innovation is yet an experiment. Men dread the censorious tendency of woman in matters of morality, even when it cannot be emphasized at the polls, and for this reason even some of those who were once in favor of

the measure begin to feel like one who has equipped his enemy for battle. This was made perfectly clear during the municipal campaign at Seattle, in June and July last. There is of course in every community an element which, with an iron-clad system of morality, would run down every ostensible vice, regardless of any social or commercial interest which they might overthrow in their career. Now, ordinarily, and especially in new countries this element is too feeble to be feared; but nobody could estimate the strength it would gather from the female vote. It therefore became necessary either to propitiate this rectilinear element or to prevent its reinforcement by its natural allies, the women.

It was a struggle of great activity in which the conservative element triumphed by a majority of 112 in a total vote of 2,526. The total number of registered voters was 2,845, about 700 of whom were women, and when it is remembered that in a new country like this the number of males greatly exceeds the number of females it is possible that, comparatively, both sexes were equally well represented.

Whether the result of the election was due to a splitting of the female vote by the influence of the male relative, or to an actual paucity of numbers is difficult if not impossible to determine, but it certainly did not arise from any want of interest on the part of the new voters. The strongest minded were on hand at the polls dispensing tickets and electioneering; they had carriages sent to the houses of their more diffident sisters, who shrank from the ordeal of going up before a crowd of gawking men and "sticking a piece of paper in a hole cut in the top of a box."

Enough transpired to teach the corrupt element of society that there was a Nemesis on its track of which it would be well to beware, and to show that the experiment has so far had a marked tendency to purify the political and commercial atmospheres. In this respect it is probably a success. Again, there is no doubt, (if it is conceded that punishment prevents crime) that the presence of woman in the jury box, especially in those cases where domestic felicity is invaded, will have a wholesome effect. But whether the new relations which are thus created between the sexes will not damage woman more than it benefits society is problematical.

It will not do to rush too rapidly to conclusions. What would be admirable here might be iniquitous in the extreme in other localities where the relative numbers of the sexes are different; so that even should female suffrage prove a pre-eminent success in this Territory it would prove nothing in a general sense. Taken as a whole Washington Territory is a pleasant, promising spot. There is none of the *frontier* element to menace the lives of peaceful citizens. The pioneers are, as a rule, intelligent, progressive men, and one is struck with the entire absence of that link between the savage and the civilized, the unprogressive backwoodsman; so that society is fully as cultured and refined and occupies as high a plane as elsewhere. 'Tis true the distinctions of caste are not so finely drawn as at the "Hub," but yet are drawn full fine enough. The laws are well enforced, and the foot-pad and the vagrant are incontinently "bounced" on first

appearance. In a word, there is to be found here all the freshness and room for enterprise of a new country, and all the intelligence, thrift, and social order common to the Western States.

SEATTLE, W. T., October, 1884.

COLORADO—A GLANCE AT ITS MINING AND OTHER ATTRACTIONS.

A. J. WHITE.

Ten millions have been paid annually for mining labor in Colorado for the past five years. The mining machinery employed during that time—not including the smelting and milling machinery—would not exceed six million dollars in value. The bullion product during that period has been about $22,000,000 annually or $110,000,000 in the aggregate. Ten million dollars are annually taken from the State and paid to eastern mine owners in dividends, enough in fact to pay for all the labor of mining and prospecting. But with all this splendid showing there is a possibility that Colorado and its rich mining industries are not well understood.

An army of disappointed adventurers have left the State since the Leadville excitement of 1879–80, carrying words of condemnation upon their lips. They had not succeeded, and mining was, of course, a humbug. Undoubtedly their influence has had something to do with the present quiet business in the State, yet with all this, last year the mines produced $26,376,562 and exceeded any previous year. This was a surprise to many, for the population had decreased and everything moved on quietly. It is now a well established fact that gold and silver mining does not require a large population to carry on its business. Two Lowell cotton factories employ as many operatives as there are miners employed in the Leadville mines, and yet who would think of building a city to be supported by their labor.

In the great work of transforming a rugged and almost impassable country from an unproductive condition, to be one of the greatest producers of gold and silver in the world, has required a heroism and sacrifice unknown to agricultural States. In 1870 the map of Colorado was a meaningless scrawl. Then the population was less than 40,000; now it is 302,300. Then it produced nothing, comparatively, in gold and silver; now it furnishes one-fourth of the bullion produced in the United States and Territories. It had a meager cattle interest at that time, now its grass-feeding animals are valued at over $50,000,000. Only a few scattering ranches were to be found in Colorado in 1870, now 1,500,000 acres are under ditch, and the profits from farming are proportionately greater than in almost any other State. It furnishes coal and coke for New Mexico, Arizona, Utah, portions of California and some of the Territories, and last year it produced 1,220,638 tons It produced last year 47,106 tons of iron ore, a large

portion being consumed by the Pueblo Iron Works, the ore being of a quality known as "magnetic iron ore" from which the best of Bessemer steel rails are manufactured, and a superior quality of nails is made that has practically driven all eastern nails out of market.

But the greatest expense and labor has been in determining where were the deposits of silver and gold of sufficient richness to justify working. The State has an area of 104,000 square miles, and a hundred times more difficult of approach in its natural condition than a level or rolling country.

The passion for discovery was never more intense in the breast of Cortez than has filled the hearts of Colorado prospectors since 1874. A mere handful of men, exceeding at no time, perhaps, over 15,000 active workers, they have hewn through flinty granite and porphyry the royal roadways to wealth, that now intersect with a splendid system nearly every mountain and gorge of this enchanting domain. Throughout the whole State towns and cities are built provided with all the demands for comfort. The area for profitable mining has commenced since the labor and sacrifice of preparation is over. Years ago the area of mining in Colorado was measured by the league or square mile—now the eye can trace its boundaries at any given point.

The really valuable mining ground in any country is much less than is generally supposed. At Leadville, if it were collected together along the entire carbonate belt extending for fifty miles or more, it would not exceed five miles square. The mines at Red Cliff, thirty miles north of Leadville, which have produced for the last three years 100 tons per day of marketable ore, are found upon Battle Mountain within a radius of a half or three-quarters of a mile. That whole country bordering and west of the Arkansas Valley, reaching over as far as the Gunnison country, shows silver and gold, and may been mentioned as a mining country, yet profitable mining can only be prosecuted in small patches of ground and only a few mines contribute to give the several districts a character and name abroad. Yet the possibilities of these patches of rich mineral deposits are beyond all calculation. In the great San Juan those localities which first attracted attention and led to the rapid settlement of the country, are little farther advanced than they were in 1875, yet small areas of very rich ores are now determined and new and valuable points are ascertained, and San Juan now presents a larger and better known field for profitable mining than can be found in any State or Territory outside of Colorado.

The only profitable mines in the Red Mountain district, which is really a new Leadville in richness, are found within an area of one mile square. Crossing the range to the north of Red Mountain you find Marshall Basin, which has the largest area of rich, paying ores in the State, it being about three miles from the head of the basin to the San Miguel Valley, and paying mines are found with almost unbroken regularity upon the northern slope of the basin and a few in the center and upon the sounthern slope. Between Marshall Basin and Ouray—a distance of sixteen miles—the real rich ores that can be developed profitably are found in small scattered areas.

The waste of labor and money required for this determination has been great, but necessary. Nothing but a mad enthusiasm could ever have accomplished it. For this reason mining excitements, while they turn back an army of disappointed men into the plow-field, store, and workshop, from whence they came, to recount their hardships and losses to their friends, are a permanent advantage and should be encouraged. Colorado at the present time has about 2,000 miles of railroad and has expended millions in building wagon-roads and tramways to accommodate its business. With a climate that is a balm for all of life's sorrows, and a people generous and enjoying that true nobility of manhood which only a resolute experience can develop, the centennial State stands the peer of all others in its attractions.

HISTORY.

BLACK-BIRD—INDIAN CHRONOLOGY UNTRUSTWORTHY.

ANSWER TO MR. FULTON, BY OSCAR W. COLLETT.

In the September number of the REVIEW, Mr. A. R. Fulton, of Des Moines, Iowa, undertakes to correct a chronological statement, or inference rather, of Mr. Collett's, as to the year of Black-Bird, the Maha chief's, death, "from the record left by so reliable an authority as Lewis and Clarke;" but instead of letting his "reliable authority" speak for himself, Mr. Fulton puts in a gloss of his own, which the text does not warrant. Lewis and Clarke had no previous knowledge of Black-Bird, or his nation, and their information on the subject was derived in the following manner: On arriving at the Omaha village they propounded questions in English, which some one put into French for the interpreter, Bolon or Dorion, who in turn rendered them into the tongue of the natives; their answers were made into French, the French into English, and this is what was noted down. Thus the "so reliable an authority," about which the point is made, means just this and no more, that Lewis and Clarke honestly report the information, *as they understood it*, obtained in the round-about manner described. The testimony is not their testimony, but the statements of Indians.

One of the purposes of Mr. Collet's paper was to cite a recent illustration of a well known fact; namely, that Indian computation of time—years, months even—cannot be trusted; and this of itself should have put Mr. Fulton on his guard to read his authority carefully and distinguish between facts reported on personal knowledge, and chronological statements derived from the aborigines. Had he done so, he would scarcely have felt so strongly as to say: "The account which Lewis and Clarke obtained in regard to the great chief Black-Bird, is certainly quite conclusive as to the time and manner of his death and burial."

It may be remarked incidentally, if Mr. Fulton has published all there is in the journal (a copy of which is not at hand) on the subject, that there is not a word as to the "*manner* of the chief's death or burial."

Mr. Collet knew that Lewis and Clarke mentioned certain details relating to Black-Bird, but rejected the chronological determination of a fact on Indian testimony as by them reported, when there appeared to be other evidence strongly contradicting the Maha date. Augustus Chouteau came to St. Louis with its founder, Laclède, in 1764, and was personally cognizant of every fact relating to the city he mentions in his depositions. His statements are the accepted data of much of St. Louis' early history. He testifies (Hunt's Min., Vol. 1, p. 107,) that on May 15, 1801, the small-pox first made its appearance in St. Louis. There are other depositions to the same effect. In St. Louis local annals the year 1801 is universally known as *année de la picotte*—small-pox year; and, as succeeding *année du grand hiver*—the year of the great winter (1799—1800), when according to Chouteau, who also deposes to the same facts, the thermometer marked a lower temperature than ever before known. Such concordant testimony fixing the year of the small-pox cannot be set aside, and must over-ride Indian chronology if antagonistic. It has always been an accepted fact that the small-pox was brought to St. Louis by boats coming up the river, and thence spread among the Indians. The month and date given by Chouteau was the usual time of the arrival of the merchants' supplies. The traders left for the Missouri in the fall of the year, the large boats on the opening of navigation, at the beginning of March if possible. The first departure, after the appearance of the disease in the village, would arrive at the Maha country in the last months of the year 1801; the next, in May, 1802. If by those the small-pox was communicated to the Indians of the Maha locality, it may have become epidemic during the winter of 1801-2, but if by these, not until the summer of 1802. As the Omaha chief is believed to have died after the malady had become epidemic, we can scarcely escape the probable conclusion that his death occurred in 1802, but in no event earlier than the close of 1801.

This presentation of facts and probable inferences is in direct conflict with Indian chronology on the point in question. By all who know how little trust is to be placed in the dates assigned to events by the Indians, it is believed that it will be accepted without the least hesitation in preference to their statements.

ST. LOUIS, MO., September, 1884.

BLACK-BIRD.

G. C. BROADHEAD.

The articles in your Monthly, for August and September, are interesting as they relate to a noted chief of the a once powerful but now extinct tribe of Indians. Extinct as a known tribe but a few of their descendants have been incorporated in other tribes.

The Mahas, or Omahas, according to Irving pronounced Omah-haw, were numerous before the small-pox nearly annihilated them. They have been mentioned by Lewis and Clark, Irving (in Astoria), and Major Long in his Expedition to the Rocky Mountains.

Lewis and Clark (1804) say that Black-Bird had died about four years before.

Irving (in Astoria) relates that Wilson P. Hunt passed the mouth of Platte River April 28, 1811. A few days after he passed the place of the burial of Black-Bird (Wash-ing-guh-sah-ba), and says he had died about ten years before.

Lewis and Clark gave the date of the death of Black-Bird about 1800. Washington Irving about 1802, and Major Stephen Long at 1800. Washington Irving says that Black-Bird was one of the first among the Indian chiefs to deal with the whites, and that he showed great sagacity in levying his royal dues. In this way he became rich and also exceeding popular among the traders of the Missouri. But his people finally became dissatisfied. But a trader instructed Black-Bird in the virtues of arsenic, and told him that through its use he could obtain unbounded sway over his people. After that he ruled them by terror, and any one disputing his authority, his downfall was prophesied and death would finally ensue.

But in Little Bow a rival of Black-Bird arose, who opposed his power. Black-Bird determined to destroy him, and for this purpose his wife was bribed. But she could not effectually conceal the perfidy and confessed her guilt "that Black-Bird had given her some of his terrible medicine to mingle with his food." She thus fell a victim. Little Bow seceded with nearly 200 followers and established a separate village.[1]

But Black-Bird was a warrior of the first water and his exploits were the theme of young and old. Under his rule the Omahas obtained great power. He waged a fierce war against the Ottoes, until the whites finally mediated and peace was restored. He also warred against the Pawnees and burned their village. He was fearless in battle and generally victorious.

At one time a war party of the Poncas had made a foray on the Omahas and carried off a number of women and horses. He took the field with all his braves and swore that he would eat up the Poncas. He defeated them and they took refuge behind some mounds of earth. The Poncas sent out a herald with a calumet of peace. He was shot down, and so was each one that was sent out. At last the Ponca chief sent out his beatiful daughter arrayed in her best attire. Her charms touched the stony heart of Black-Bird. He accepted the pipe at her hand and smoked it, and from that time peace reigned between the Poncas and the Omahas. The beautiful damsel became Black-Bird's wife and she exerted great power over him. But he was fierce and vindictive, and during one of his passionate fits his wife had the misfortune to offend him, when suddenly drawing a knife he laid her dead at his feet. His passion was at once gone. Drawing his buffalo robe over his head he sat down beside the corpse and remained there without food and apparently sleepless for three days.

1 Long's Exp., Rocky Mountains, 1819.

His people could devise no means to attract him. At length a woman brought a little child and laying it down placed Black-Bird's foot upon its neck. The heart of the savage was touched. He threw off his robe, made a harangue upon what he had done and from that time on seemed to have thrown off the load of grief and remorse. He died of the small-pox.[2]

When he found his end approaching he called his warriors around him. He told them that his desire was to be buried on the top of a high hill overlooking the river from whence he had been accustomed to view the approach of the white man. He also directed that he should be interred seated on his favorite war horse. His orders were carried out and from the top of the mound was erected a staff on which floated his banner and the scalps he had taken in war.

ARCHÆOLOGY.

DID THE ROMANS COLONIZE AMERICA?—CONCLUSION.

M. V. MOORE.

II. THE LATIN TERM.—We shall consider next the term for Water or River, used by the Romans.

It must be admitted that the Roman geographers were familiar with antecedent literature—with antecedent river nomenclature especially. But notwithstanding the fact that the Latin was a composite language, there are many words therein, the existence of which were unknown until the Roman language had its birth and became fixed in the literature of the world. Among these words was the well-known term Aqua, with its peculiar Latin pronunciation. Although a cognate of the Sanscrit and the Celtic terms, the equivalent of our word for water or river, its birth is at a well-defined historical period.

And yet if we accept the testimonies of the early explorers of America, this word Aqua was well and thoroughly known, and correctly spoken, by the native peoples here wherever the foot of the pioneer trod.

The very first river names recorded by Columbus and the secretaries of his expeditions reveal the word Aqua. The revelations come to us tinged with the Spanish of the writers, and very naturally so too, in the garb of "agua"—this being the Spanish writing of the Latin term. But the examples are recorded as "native words." Among others are Xagua, Xaragua, Cubagua, and Yagua or Yagui.[1]

The initial X in these examples is but the Spanish representation of our English Ch: an English transcript of the same syllabic sounds would give the word Xaragua as Charaqua.

2 Irving—Astoria.

1 See Irving's "Columbus," Vol. 1, p. 154.

Columbus records many of the aboriginal river or water names wherein the Celtic term Acha is apparent, in the writing "aca"—as Jamaica, Macaca. etc. The words Carib and Cariba—and about which the discoverer evinced so much concern—are also easily located in the Latin language which contains *Caribus* (from the Greek); this being the Roman word for sea-crabs or turtles. The world knows how famous the West India Islands have long been for immense crustaceans, the celebrated green turtles. In the word we see the origin of "Carabean"—"Caribbean Sea."

There is a long list of aboriginal river names (and other words having analogous origin) showing the term Aqua in purity. There are countless others rendered with so slight an infringement upon the correct orthography of the word, we can readily understand that the corruption is due, not to the aboriginal pronunciation, but to the versions of modern scribes; as for instance, "acqua," "aquo," "aqui," "aque," and "agua," instead of merely Aqua, in such names as Acquasca, Aquokee, Aguachapa, etc., etc.

Again: we often labor under difficulty in determining what is an aboriginal name or a mere Spanish one in those sections of the New World that were long under Spanish domination. There is one fact, however, that assists in removing doubts. The modern Spanish ideas in the application of river names in America, were not always based upon the aboriginal models heretofore referred to. The priesthood accompanying the expeditions of early colonization had much to do in the coinage of nomenclatures here. Hence, names not purely Indian are often found with a prefix indicative of the Spain of three hundred years ago. We have numerous *Saints* in the "Sans," and other titles pertaining to ecclesiasticism,[2] in the Spanish names in America. "Rio," also, often appears in connection therewith; while words that evince a conformity to the Indian models may be safely written as "native names," even though they do at times indicate tho Spanish idioms. Among these are Aguapahee, Aguila, Ahagua, Aguadeela —and many others. (Pronunciations given in these words are not always the foreign writings thereof.) The "ahee" of these names reminds us of the Germanic Aha, and La is evidently Li or Ri.

In addition to names already written showing the presence of Aqua in the Indian nomenclature, we may cite the following:

Acquia (of Va); Aquiras (Brazil); Agaqua (Tenn.); Talaquah (in various places in the South); Chatauqua and Chapaqua (N. Y.); Cofaqua (Mexico); Aquehono (Texas); Alaqua (Florida); Atchalaqua (Ga.); Tamaqua (Pa.); Telaqua (Tenn.); Aquakannock (N. J.); Aquala (Ga.); Aquona (N. C.); Piscataqua (N. H.); Maaqua (N. Y.); Inctaqua (N. C.); Sadaquada (N. Y.). The list might be extended.

Aquana is the same as Abana. Both names are found in the Indian. The Sadaquada was written also by the French Sauquoit. It is one of the tributaries of the Hudson or Maaqua (through the Mohawk).

In words like the following it is difficult to determine to which root the Indian

2 Florida was discovered on Palm or Easter Sunday, a day celebrated by the Church—hence the name.

name belongs—whether to the Latin Aqua, with its Spanish rendering, or to the Sanscrit Ogha (which is perhaps the true parent of the later word). The evidences, however, are in favor of the Latin, from the fact that in the Old World, among all the titles given to the rivers, *this version or pronunciation of the Sanscrit word is rarely if ever found :—*

Nicaragua, Autaugua, Watauga, Saguana, Chickamauga, Connesagua, Paragua (Paraguay), and Uragua. We have also such names as Chicago (*Chuckagua*, one of the early names of the Mississippi), Canadinagua, and many other "aguas." What is supposed to be one of the earliest writings of the name now written Connesagua is in *Canasaqua*. (Ramsey's "Annals of Tennessee," p. 26.)

Some Epithets and Idioms in the Aboriginal Indian Names.—As an evidence that the early colonists of America—or at least those who named the rivers of the Continent—are really of comparatively modern extraction, we may cite the fact that their nomenclature abounds in adjectives and descriptive phrases, while the language of primitive men in remote eras, as stated in a previous paragraph, indicates only the briefest nouns and verbs. A great majority of the (apparent) epithets in the native American names have unmistakable identity with the Latin. Roman idioms and phrases are presented with very curious and interesting development in analyses of those names—especially names of some of the great rivers of the Continent.

The Roman term for great was the well-known word *magnus*. Its abbreviation in the Latin was *magh*, *ma* (or *mah*, which refers to its Sanscrit root. *Mak* is the brief transcript of the Greek synonym.) The letter M was sometimes used as an abbreviation.

Now it is a very various and striking fact that this letter M, or some other abbreviation of *magnus*, is in the native "appellation" of nearly all our great waters. It is, indeed, in the name of all, with the exception of those where the sublime idea is indicated by terms other than in *magnus;* or where there was some conspicuous natural fact so distinctive as to require illustration otherwise—as, for instance, in the case of the Orinoco of South America. I believe this word is simply *Orien aqua*—or the river that runs to the *Sunrise*. This is in perfect illustration of the actual physical fact; no other river in the world for the same distance runs more directly to the Sunrise, or to the *Oriens*, than the Orinoco. There is another river in North America that had originally the same Indian name—the *Orien(s)aqua*. It is a river that runs so nearly to the sunrise, that in an easterly course of over two hundred miles it crosses a single parallel of latitude six or eight times. Its ancient name has been corrupted to "Roanoke"; but if the student desires to find how the earliest explorers of Virginia and North Carolina wrote the word, the versions will be found in "Hawks' History of North Carolina." Local tradition preserves the original name yet in the famous "Oronoko tobaccou" that grows along this river.

These, indeed, are remarkable coincidences. The early Indian's mind was thoroughly scientific, and titles were truly characteristic. Definite expression, as we have stated elsewhere, was conveyed in the word coined. Hence, when a

river name was spoken, the audience at once knew the character of the water. This was the general rule, though exceptions appear. We cannot now determine the facts fully, because many of the descriptives of the Indian names are evidently gone from the more modern title. We know that even in the historical period many of these (descriptives) have been dropped. For instance, we have now simply "Mackinaw," where it was originally Michilli Mackinaw (or *Maaqua-na*). We have now in our geographies and on our maps simply "Haw," where the original was *Saxapahaw*—two well-known descriptives gone from the ancient name. We have also "Toe," where it was originally *Estatoe*. Numerous examples could be cited had we space for illustration.

The Latin birth of the descriptive in the examples given will be seen as we proceed.

Not only have the Indian names been often shorn of their strength and vigor by the abbreviative spirit of our modern age, but sometimes those names have been clad in the most fanciful of garbs by literary æsthetes. In a group of the fanciful names appear Tennessee and Mississippi.

Let us analyze the latter, as it is one of our great waters having in the title the letter M.[3] Before we proceed, however, with the task of analysis, we should formulate full principles upon which we can proceed legitimately, dealing, as we have to, partly with the absolutely unknown. There is a principle, well understood in the higher branches of mathematical science, applied in the elucidation of problems where, with a knowledge of three factors, the fourth or the unknown is an easy demonstration. In the case of the Indian names we often have undisputed facts in our favor. In the example Orinoco we have the illustration of a physical nature that cannot be controverted. Secondly, the fact that the Indians' words *mean* something—the fact that they have definite significance—certainly cannot be eliminated from the problems before us, if we have the evident descriptive epithet yet remaining with the name. We have also often the testimonies traditional. Fortunately the gap lying between the coinage of the word and its communication to our ancestors in the historical period was not so great but that the truths of history were often securely held in the memories of the native, and correctly transmitted. We should not, however, attach too great importance to mere tradition, unless it is corroborated by the physical and the verbal facts. If these, however, shall all agree, and a comparative investigation reveals a further coincidence and corroboration in the Latin language—in the Roman theory—we certainly must consider the evidence decidedly in our favor, if not irrefutably sustaining the positions assumed.

3 Among the waters of the Western Continent, having in their aboriginal titles the letter M, are Mississippi, Missouri, Merrimac, Potomac, Moratoc (lower Roanoke), Michigan, Kallamuckee (great Tennesse), We-apa-ma-ooka (Albermarle Sound), Ma-aqua-esque-don (Delaware Bay), Ma-aqua or Mahaqua (Hudson), Appomatoc (James?), Minnesota, Alabama, Amaccura (in Florida and South America also), Ammasona (Amazon), Vermaha (La Plata), Mackinaw (Lake Superior), and Wasmasaw (Cooper). Webster says that Massachusetts means "great hills." The tradition in regard to nearly all the names cited connects the term "great" with the words.

Applying the touchstones, let us begin with the Mississippi, the greatest of our rivers. There are many traditions in regard to this name. There is one—given in Barnes' School History—which gives the meaning as "the gathering of the waters." Certainly there is the great physical fact illustrated there—in the current of that mighty stream; the waters of nearly half a continent are "gathered" in its embrace. The physical and the traditional here agree. We encounter, however, a difficulty in determining the full verbal facts, for our learned men are not fully agreed as to the true word. Hence we are required to evolve or produce order out of the chaotic material found in historical and literary archives. The modern writing, "Mississippi," as previously observed, is a work of fancy. The original has been given as "Metche Sepe" by grave and learned authority; and "sepe" or "sippi," is a recognized term for river in the Indian. These evidently have origin in apa—the "epe" or "ippi" being mere corrupt pronunciations of the Wallachian word (apa). There are, I think, less than a dozen of the Indian river names now written in "epe" or "ippe;" while in scores of them the river term is rendered in Apa and Aba. Marquette, in 1673, gave the original word as "Metchi Sipi." The missionary Allouez, in 1665, wrote it "Messipi;" and one of transcripts of the river name given by De Soto, the discoverer, in 1540, shows "Mico" (or Meso).

The original name is evidently composed of two terms—the prefix being something which the early writers endeavored to transcribe as "Messe," "Messa" or "Metcha." A close scrutiny of all the testimony bearing upon the name—comparing it with the word Missouri—makes the true aboriginal name Messis-apa. We must take the name Missouri into consideration from the fact that geographers and geologists alike generally regard the Missouri as the true Mississippi. The Indian evidently took the same view of the rivers; for the two words are almost identical in origin and significance.

The descriptive in the names are pure Latin. They come from the verb *meto*, which means *to measure*, or to *gather togther*. In conjugating the verb these forms are developed: *meto*, *messis*, *messoi* (or messio). The latter means "the gathering." This epithet, joined with Sanscrit term Ri, which is indicative of the rapid, rushing current so characteristic of this river, gives us almost the identical orthography originally used (by our earliest explorers there) for the name Messuiri.

There are nice subtle differences in the two names—Messuiri and Messisapa—that betray in their coinage a mind schooled in science, not only the science of lexicography, but of geography and hydrography also. From Memphis down—say from the point where De Soto first discovered the river—the name Messis-apa truly applies. This word means, with the Latin theory in regard to the prefix—*the gathered water*. Above that point the river *is gathering into its embrace* the other great waters of the valley; and hence the legitimate application of the participle to the upper river, hence the *Messui-ri*—truly *the gathering river*—and not the "muddy river," as some authorities say the word means.

These are certainly striking, if not startling, testimonies revealing the In-

dian's knowledge of the mother (Latin) tongue. There is, without doubt, in them a corroboration of the three-fold facts—the verbal, the physical, and the traditional.

But these are not all the valuable facts in connection with the river that evince the Indian's knowledge. The Mississippi was known to the early aborigines also as the Chuckagua (Ramsay's Annals of Tennessee). This is the title, doubtless, which gave rise to the tradition that the meaning of the name was "Great Father of Waters." We see the term "water" in the word in the Spanish version of the Latin *aqua*. The expression "Great Father" is supposed to be represented or expressed by the prefix "chuc," which is furthermore supposed to be the same as the Hebrew Jah[4] (or Jehovah)—the Great Father. This Hebrew term, or its corruption, is often found in the Indian nomenclature, and written in transcripts showing now "Chi," "Che," "Chu," etc.: and what is more remarkable still, this term is nearly always in names applying to waters about which there is great mystery or grandeur. It appears to be a fact that the word Jehovah was once known in purity to the early colonists of America. The Choctaw Lexicon has it as belonging to that language. And that their word is not a mere modern appropriation or adaptation of the ancient one we have striking evidence. The Choctaws print it as "Chihowah." Now, an ancient tradition gives the aboriginal name of the Delaware River as Chihohocci (or really *Chihoaqua*). The legend (as recorded by Mrs. Ellett—Poems—Tradition of "Delaware Water Gap")[5] is that God's Finger—or the Finger of the Great Spirit,—once touched the mountain, at a place now known as Delaware Water Gap; the rocks were then rent asunder, and the waters released from their long confinment in the valleys beyond. Hence the name—simply God's River.

Reserving for a future article other illustrations of the Indians' use of the Hebrew term, let us return to those names wherein the Latin *magnus* or its abbreviation is seen.

There is a tradition, I think mentioned by the historian Bancroft, that makes the meaning of the aboriginal name of the Hudson simply "The Great River." The Hudson has had many tribal appellations, mere dialectic distinctions. But the title that appears to be the oldest, the one most in conformity with the recognized models of the aborigines, is the word Mahaqua. This appears first historically in connection with one of the oldest tribes along the river (see Am. Cyclopedia, vol. I., p. 188.) But it is a well known fact that the aboriginal nations usually received their tribal distinctions or appellations from the name of the river upon which the people were first found by the early white explorers here. This is in accordance with a custom which has obtained in all ages of the world. The conclusion is therefore legitimate that the name Mahaqua was first applied to the river. We are supported in this conclusion by all the historical facts pertaining to the name. The same name lingers still in a corruption of the old

4 In the Spanish language—from which we get the Indian originals—Ch and J are the same in sound.

5 Citation made from memory—the authority not at hand at this writing.

word, a name which applies yet to a tributary of the great river. This corruption is the word "Mohawk." Other corruptions of the ancient names exist in "Mohegan" and "Mohican" (which are identical, illustrating an outgrowth from the primal word, and illustrating also the kinship between the terms Ogha, Acha and Aqua.)

The name Mahaqua is pure Latin—acknowledging the prefix "Mah" to be but the Latin abbreviation (Sanscrit root) of the word *magnus*. We have not space in this magazine for analyses of all the native Indian names showing the abbreviations of the Latin *magnus*. There is one illustration, however, we cannot omit in this paper. The early explorers of the coast lands of North Carolina and Virginia found the natives almost everywhere in their discoveries using the term "Occam" (or *aquam?*) in referring to large bodies of water. (See Hawks' History of N. C.) A large Carolina lake is now known as Waccamaw (*Aquamah*).

The word "Occam" illustrates a distinct Latin idiom—the Latin being one of the few dead languages that allows the terminal in a consonant: the Greek forbids it. There are many Latin idioms illustrated curiously in the Indian names. We shall cite some interesting examples before closing this paper. Before proceeding with them we desire to notice a group of names revealing a descriptive about which there can be no question as to its legitimate location in the Latin language, if comparative illustrations and analyses can demonstrate truth.

In some of our northwestern States the term "Minne" is often found in the the native Indian names of waters—as Minnesota, Minneoah, Minnewaukin, Minnetonqua, Minnehaha, etc. It is evident that there was some conspicuous natural fact which gave birth to the expression "Minne" in the mind of the early aborigines.

What was this fact? Science, with its many voices, gives utterance to eloquent truths in our behalf. Geology and physiography enfold their testimonies. The blunt, plain English pioneer of modern times pushes into that same northwestern country, and everywhere the same suggestive natural facts present themselves, and they are marked down on our maps in the terse and vigorous expression of *his* vernacular—simply *the Red*, or *the Vermillion;*—and if we look into the geographical literature of the country there, we shall find "the Great Red River" (of the North), "Vermillion Lake," "Red Lake," etc. Underlying the country are vast deposits of *red* clay, *red* sandstone, and *vermillion* earth. Many of the waters there have in consequence the *reddish tinge*. These are the natural facts so prominent and suggestive there. They were equally impressive upon the mind of early pioneers whether in the few decades ago or in the far centuries gone by. Each of these pioneers took from his vernacular its most expressive word, and left it as a perpetual memorial of birth and origin. And if we open our authorities on language, we find in the Indian "minne" merely the Latin *minio*, which in plain English means precisely the *red*, or the *red vermillion* clay.

It would be difficult to find verbal testimonies more conclusive than in those

Minnesota names. There is not in them an isolated expression of a fact—the evidences are numerous and unmistakable. And yet if we attempt a more careful analysis of some of the names we are met with cumulative testimonies. The legend says that Minne-ton-qua means "thundering water." The Latin has *tono* for thundering—and the "qua" is but abbreviation of *aqua*. Minnehaha reveals one of the Roman idioms referred to in a previous paragraph. The word contains, as a term for river, the Teutonic Aha, the equivalent of Celtic Acha. The name is supposed to have applied originally to what is now known as the "Great Red River of the North." It is no unusual occurrence for an interchange of names to be found in our growing country. In more modern times two of the Texas rivers have changed names. The Brazos was once known as the Colorado, and the present Colorado was known then as Brazos. Other examples could be cited. The poetical associations of Minnehaha have had much to do in its history. (I would not detract from the memory or fame of the grand old bard who has immortalized that word; rather would I lay additional honors about his own immortal name.)

In analyzing the word Minne-h-aha we discover what might appear as a superfluous h, yet, if we are right in our conclusions, the letter is there for a definite purpose. It is there as an expressive factor in the name. If we were to suppose the name meant simply "red water," we should perhaps do injustice to the Indian's art and knowledge. Let us probe the problem deeper.

By reference to our standard authorities on the Latin language, we find that the letter H is often the abbreviation of the word *habeo*, which, with most vigorous translation, means *to hold*. The word Minnehaha would therefore mean, with a liberal construction, river that holds red or vermillion clay. This is demonstrated by the actual physical facts:—the waters do hold the red element for a long distance.

Have we other examples illustrating this idiom? In the Southern States are many rivers that flow through low alluvial soils and often in banks of a loose, friable clay. These banks are continually "falling in,"[6] and hence the waters are always muddy. The Talla-ha-chie is a noted illustration. We have the river term in this word in the Celtic Acha. The intermediate H indicates the *habeo* or holding the *talla*. What is "talla"?

A reference to our Latin shows us that *terra* and *tella* are identical in that language. The Southern Indians very rarely used r: and "talla" is but a corruption of *tella*, the earth, or the earthy débris held in solution in these muddy southern rivers. Those who know from observation the character of those rivers, know that this earthy débris (represented by the "talla") is one of the distinguishing features of those rivers.

One of the Alabama rivers which is always muddy (where I have known it) is the Talla-p-oosa. This word is replete with suggestiveness and truth. The

6 Tradition says Monongahela means "falling-in-bank river." The suffix "ela" is easily located in the Latin *elabor*, which means to *fall out*, or *slip away;* hence the Indian "falling in." Our English word *elude* perhaps has same parent.

river term here is "oosa." This is considered an old Saxon word for water (see Webster—"ousa"). It is, however, found in ancient river nomenclature in every quarter of the world. It is often in the native Indian names. It is doubtless a corruption of either Acha or Ogha.

We see in the name, as we have it divided, Talla p-oosa, three factors; a descriptive prefix in "talla"; with the suffix "oosa," an acknowledged river word. What are the functions of the other element in the word—the simple letter p? Indisputable testimonies give response to our query.

First, what is the other natural fact in connection with this muddy river? It is a very *powerful* stream. The immemorial legend says that the word means a "swift current" or "swift water." Well, swift waters are generally waters of power. But do the verbal facts coincide with these testimonies? Opening our Latin authorities again, we find that this letter p is a recognized Roman abbreviation of the word *pondo*, which means powerful. These are facts which the most skeptical cannot reject.

This tell-tale letter P—like the neighboring one M—is a curious exponent of verbal and historical facts. It is found in many native Indian names where the rivers are rivers of great available waterpower. (All great rivers have a certain element of "power." But we are now considering the available feature of that power.) Some of the most noted rivers in America, where the motive power is developed or available, have this letter P in the title. The Potapsco is the most powerful river of Maryland. The Saxa-p-ahaw turns more machinery than all the other North Carolina rivers. The Winnepeg, the Winnepesocket (or really the *Winne-pisc-aqua*), the Penobscot, the Rappahannock, the (Upper) Potomac, and many others having the letter P in the Indian name, are all noted for their water powers.

(The Potomac betrays either Greek origin [in *potamos*—river] or in *poto* and the abbreviation of *magnus—mag* or *mac*. Virginia has many rivers that reveal both Latin and Greek in their "native Indian names." There are for instance Fluvanna [from the Latin *fluvius*—river] and also Rivanna—from *rivus*, another Latin word for river. Rapidanna and Rappahannock also show Latin words.)

There are some very interesting and suggestive facts in connection with several of the examples cited in the above paragraphs—independent of the mere Latin theory. Let us indicate specially the Saxa-p-aha, the Penob-scot (or the *Penapsca*) and the Potapsco. The former contains the pure Teutonic term Aha, and also the Latin root of our English word for rocky—*Saxeum*. This Latin word, however, has its remote origin in the Sanscrit *Sax*, or *Ska*.

Scholars are familiar with the derivatives of the Latin word *Saxeum*, and the Sanscrit term *Ska*—such as "rough," "rocky," "stony," "scabby," "scaly," etc., etc.

Now if we investigate the character of the waters, their channels, etc., in America, having in their names either of the terms, the Sanscrit *Ska* or the Latin *Sax*—which, as we have observed, are identical—we are met with the startling fact that they are among the very roughest and rockiest on the continent. The

Saxapahaw is one of the roughest and rockiest rivers in N. C.,—the ledges of granite over which the waters break aiding in developing the immense power of the river. The Saxatchawan (with its Celtic Acha) is the rockiest and most powerful river in the British American possessions. The only river in the Gulf States having a native Indian name that contains the term *ska* is so proverbially rough that in common English parlance it is known as "the Flint" (of Alabama). The aboriginal name is Thro-na-dee-ska. Two ancient river terms are revealed in this word, in addition to the unknown prefix and the Sanscrit suffix.

The Sanscrit suffix is in many native Indian names; but it is rendered in various (modern) orthographies. "Ska," "sca," "scaw," "sco," "scow," and "scot" are all versions of the one true word—the latter (scot) supposed to be an original French rendering, the final *t* silent. The term ska is often in old nomenclatures, especially in the rough and frozen regions of Europe and Asia. In addition to the American words already mentioned, we see it in Nebraska, Alaska, Yamaska, Athabaska, Caniapascaw, Androscoggin, and in numerous others. (The latter name is correctly written Ame-ri-sca-gan.) The Caniapascaw is variously written. It is sometimes given as Caniapuscow. It is well known, however, that all the existent orthographies for our Indian names are chiefly conjectural and fanciful. The various writings are but the efforts of scribes to give transcripts of the syllabic sounds contained in the words. There are no common and universal methods of expressing in written characters all syllabic sounds—especially the sounds of a foreign tongue. This fact has given rise to difficulties long recognized and wide-spread in literature, and especially geographical literature; and also in the nmenoclatures of the human families. It is well known that the transcripts we have for nearly all the words in Oriental languages do not correctly represent the names as they exist in the native speech. Examination of our "authorities" on the Indian language shows the uncertainties that exist in the minds of our learned men in regard to aboriginal American names. We often find several transcripts of one word recorded in order that the reader may recognize the difficulties encountered in arriving at the true othography. The etymology of the Indian language is yet to be reduced to a science; its present orthography is but a field of conjecture, as we have seen.

To illustrate this fate we cite a name which has been written in one of the previous paragraphs as the Winne-pisc-aqua. Our authorities say that *Winnipiscogee*, *Winnepisockee*, and *Winnepesocket* are all recognized methods of writing the word. The latter with its final *t*, betrays the hand of a French writer. We desire to notice in a future article the terms in this name more fully, giving our reasons for writing the word differently from modern geographers. For the present, we wish to discuss further the diverse methods of expressing in English the syllabic sounds in the Indian.

There is a corruption of Acha (aka, with the hard sound) often found in the river nomenclatures of the world with an expression, rendered, in English *pronunciation*, as *eka* or *ekuh*. It is variously *written* by geographers as "eco," "ico," "ika," "eque," "ega," "ucuh," "ucah," "aga," etc. In the Russian language

the word for "river" embodies the same sound heard in this corruption of Acha. That Russian word is transcribed in English as *reka*, *raga* or *rega*—the *r* merely an abbreviated expression of the Sanscrit Ri.

Names that are typical[7] of countless others in the Indian language are written in our geographies Cocheco, Oswego, Topeka, Canecuh, Mexico, etc. The latter name was once written Mexique. The fact is, this is the present French writing of the word. Megico or Mejico is the Spanish orthography.

Our wise men have speculated long and unwisely over the origin and significance of the word Mexico. Let us but remember that it comes to us first through the Spanish. That Spanish word, as we have seen, was Mejico (or *Mejaquo*). The "Mej" in this word is but an expression of the syllabic sound heard in the Spanish or Latin pronunciation of the word *medius*—just as we often hear the syllabic sound in "Ind-ian" rendered *Inj-un*, or *In-jun*, in English pronunciation.

This gives us a key to the long-sought mystery. Other science comes to our aid again. We consider the physical facts pertaining to Mexico. This strip of country is *between the two great seas*—it lies *in the midst of the water*, or in plain Latin, *media aqua* or *med-aqua;* and hence Mej-aqua, or Mexico.—*Magazine of American History.*

MODELS OF THE PREHISTORIC PUEBLOS OF NEW MEXICO AND ARIZONA.

Col. Stephenson, who has for several years devoted his time to a systematic research into the mode of construction of the Pueblos of New Mexico and Arizona, started for the scene of his labors again last night. He will continue the work of last summer and will make a general ethnological collection illustrative of the customs and condition of the arts among the present Pueblo Indians. One of the most interesting features will be a collection of pottery, of which these people make a great variety, skillfully decorated and of elaborate and tasteful designs. Much of the material will be sent by the bureau to the New Orleans Exposition.

The National Museum in which the offices and workshops of the bureau are situated, is being rapidly fitted up for the purpose for which it was designed, but there are still odd corners fenced off from the public gaze. In one of these divisions a number of workmen are engaged under the supervision of Mr. Victor Mindeleff, constructing a series of models of seven pueblos of the Province of Tusayan. These towns are Te-wa, Se-chom-a-vi, Wol-pi, Ma-shong-ni-vi, Shepan-el-e-vi, Shi-mo-pa-vi and O-rai-be, which were visited by the Spaniards about the year 1540, and are still inhabited by descendants of the Indians whom Coronado then saw. These models are being made from the most accurate measure-

7 Onega is a typical Russian name. Tanganika contains a typical African expression. Stanley says that the word Tanganika means in the African dialects "great lake."

ments and plans, supplemented by sketches and photographs of every detail which were secured during the field season of 1883. The models are all being made to a uniform scale sufficiently large to show distinctly all the minor features of the architecture and construction that have been followed from time immemorial by those interesting and secluded groups of men. They represent very faithfully the character of the masonry in color and texture. Many experiments were tried before a substance could be found that would properly represent the originals in this respect, and at last a species of papier mache, the basis of which is macerated greenbacks from the Treasury Department, was hit upon. The seven towns which it is the purpose of Mr. Mendeleff to portray are built upon the mesas or table-lands of the mountains of Arizona, all upon the same plan. Walls of stone cemented with mud support beams upon which boughs and dried grass are placed and covered with a cement formed of mud. The houses are generally rectangular in shape, and are built to a height of four or five stories, in the form of terraces, one upon the other. Originally there were no means of ingress or egress upon the ground floor, admission being gained through doors in the second story, reached by a ladder, which was drawn up in time of danger. Recently, however, since the advent of the white man among them, some doors have been cut in the lower stories. The seven models described are nearly completed and will be sent to the New Orleans Exposition.

A series of models of the ruins of the cliff dwellings and the remnants of other prehistoric architecture is being prepared from the data secured during last season's field operations. The cliff ruins referred to occur principally in Cañon di Chelly, in northeastern Arizona. These cañons have been formed in a soft stratified limestone, in the present instance to a depth of nearly 1,000 feet. In the bottom of the chasm a small stream known as the Rio de Chelly is found. Overlooking this stream, and perched upon the hardened ledges that have been left by the erosion of the sandstone, are seen numerous cliff ruins, varying from a single room to clusters that would easily accommodate several families. These are usually found grouped around a central ruin or small pueblo, which is built upon the flat of the cañon bottom. One of the models in course of preparation illustrates one of the ruins of this latter class, with its cliff-dwelling overlooking it. Wherever the action of the weather has formed a recess or alcove in the vertical rock face these ancient builders have selected a site for their curious inaccessible structures. The architecture of the prehistoric rates, as well as the pottery found among the relics, surpasses in design and construction the work of the modern Pueblo Indians.

All of the models will be sent to New Orleans, and when the Exposition closes there they will be returned to the National Museum. They will undoubtedly attracted a great deal of attention, as they are the only ones of the kind ever exhibited. One model was made last year and is one of the chief objects of interest in the museum to-day.

The seven towns mentioned above are inhabited by the Moquis Indians. They number about 2,000 souls and are dependent upon agriculture and sheep-

raising for their existence. The Government makes no provision for the Pueblo Indians in the regular appropriation bills.—*N. Y. Evening Post.*

ANTIQUITY OF MAN IN AMERICA.

PROF. F. W. PUTNAM.

[*Reprinted, with slight changes and addition of note, from Proceedings of American Antiquarian Society, at Semi-Annual Meeting, April* 30, 1884.]

Frederick W. Putnam, Curator of the Peabody Museum of American Archæology at Cambridge, made a few remarks bearing upon the antiquity of man in America, based upon objects recently received at the Museum.

He presented photographs of four blocks of tufa each containing the imprint of a human foot. These blocks were cut from a bed of tufa sixteen feet from the surface, near the shore of Lake Managua, in Nicaragua, and were obtained by Dr. Earl Flint, who has been for several years investigating the archæology of Nicaragua for the museum and has forwarded many important collections from the old burial mounds and shellheaps of that country. The volcanic materials above the foot-prints probably represent several distinct volcanic eruptions followed by deposits of silt. In one bed, apparently of clay and volcanic-ash, six and one-half feet above the foot-prints, many fossil leaves were found. Specimens of these are now in the museum and their specific determination is waited for with interest. While there can be no doubt of a great antiquity for these foot-prints, only a careful geological examination of the locality and a study of the fossils in the superimposed beds will determine whether that antiquity is to be counted by centuries or by geological time.[1]

1 Since this notice was printed in the volume of Proceedings the Museum has received from Dr. Flint a representation of a vertical section of the quarry 300 yards from Lake Managua, as follows:

Surface soil,	12 to 18 inches.	
Hard Tufa,	20 "	
Seam,	— "	
Hard Tufa,	20 "	
Seam,	— "	
Hard Tufa,	17 "	
Seam of black mould,	— "	
Compact Tufa used for building purposes,	28 "	
Seam of black mould,	— "	
Hard Bluish-ash and Clay, containing fossil leaves,	14 "	This layer increases to 15 feet to the South and South-West.
Hard yellow Clay (native name *Tal-petate*),	12 "	
Scattered Pumice,	2 "	Variable.
Sand,	7 "	
Compact Tufa used for building,	47 "	
Seam,	— "	
Compact Tufa,	6 "	Variable, 5 to 7 inches.
Dark Sand,	1 "	
Hard Tufa, dark,	2 "	
Sand,	1 "	

He also exhibited a portion of the right side of a human under-jaw which was found by Dr. C. C. Abbott, in place in the gravel, fourteen feet from the surface, at the railroad cut near the station at Trenton, New Jersey. It will be remembered that in this same gravel deposit Dr. Abbott has found numerous rudely made implements of stone, and that in 1882 he found a human tooth about twelve feet from the surface, not far from the spot where, as he states, the fragment of jaw was discovered on April 18, 1884. Both the tooth and piece of jaw are in the Peabody Museum, and they are much worn as if by attrition in the gravel. That they are as old as the gravel deposit itself there seems to be no doubt, whatever age geologists may assign to it, and they were apparently deposited under the same conditions as the mastodon tusk which was found several years since not far from where the human remains were discovered. While there is no doubt as to the human origin of the chipped stone implements which have been found in the Trenton gravel, a discovery to which archæology is indebted to Dr. Abbott, the fortunate finding of these fragments of the human skeleton add to the evidence which Dr. Abbott has obtained in relation to the existence of man previous to the formation of the great Trenton gravel deposit.

MEDICINE AND HYGIENE.

THE GERM ORIGIN OF INFECTIOUS DISEASES.

H. R. PAYNE, M. D.

It must be the common observation of every thoughtful person that we are living in an age of great progress, and that the learned theories and traditions of the past are rapidly giving way to the new lights of to-day. We see this to some extent in every department of learning, we see it in the sciences, and especially so, when applied to the art and science of medicine.

Medical history in the early ages advanced from the time of Hippocrates, to that of Galen; in the dark ages it receded; upon the revival of letters, as in other departments of learning, it emerged from the general gloom. In the early part of the seventeenth century Harvey discovered the circulation of the blood; in the following century Jenner made his great discovery as to the protective power of the vaccine virus, at about the same time Galvani achieved a world wide reputation as the discoverer of galvanism; Faraday followed him by making additional discoveries in electricity and electro-magnetism; in materia medica, perhaps, the

Foot-prints on Surface of Compact Tufa (quarried for building purposes). This bed of tufa is forty-seven inches thick and rests upon the original soil, containing stems and leaves; probably the former level of the lake.

——— = 15 feet 9 inches to 16 feet 3 inches of materials above foot-prints.

great majority of medical men will admit the great benefit that quinine has conferred upon the human race; valuable instruments have been invented for the detection of disease; to sanitary science all honor is due, as it has greatly prolonged the average period of human life, and in the last few years has kept fully abreast with the spirit of the times.

But notwithstanding all these improvements and discoveries, the same progress has not been made until recently in the etiology of disease. It must be acknowledged that the *causes* of disease, and the understanding of them, lie at the very foundation of successful medical art. Without this knowledge the physician is left to his own speculations, or follows the lead of some able authority who has boldly marked out new channels of thought, and whose theories (too often metaphysical) have attracted adherents from all parts of the world. In this way theories after theories have arisen, which have controlled the minds of men, and perhaps for a generation became the established principles which guide in the treatment of disease; we have only to refer to the practice of bleeding, so ably championed by the great and good Dr. Rush of this country, which was only discontinued when it was found to be not only unnecessary, but positively injurious in very many cases. Following this radical treatment came the revival of the old but somewhat modified expectant method, which is practiced by physicians in very many cases down to the present day. It consists in waiting and watching for the manifestations of the disease, and meeting the symptoms, and combating them by treatment as they may arise, supporting the patient for the approaching crisis, but relying very much upon the recuperative powers of the system to expel the cause.

These frequent and sometimes violent innovations, naturally produced sects, or systems of medicine, which as the world knows have fluctuated from one extreme to the other. During this conflict of opinion as to the cause and treatment of disease, scientific men have, especially of late years, been engaged in a spirited discussion as to the origin of life; the desire of men to understand it has been a subject of great inquiry for a long time. Some have contended that life had its start from inorganic matter. Ernest Haeckel, the philosopher, is a firm believer in this theory; he goes so far as to claim that as carbon, oxygen, nitrogen, iron, sulphur, etc., are found in inorganic nature, and the same elements are also found in animal and vegetable life, therefore, that all life must have originally started spontaneously from the union of some of these elements; so firmly was he convinced of this that he prevailed with his government to appoint a commission, himself at its head, to settle the question; but after long and repeated trials the commission closed its work without accomplishing anything. This theory is not only accepted by many medical men, but some of them have applied it as the cause of disease, and believe that at least all of the epidemic and contagious diseases originate from spontaneous generation; they believe that the specific poison arises from the decomposition of dead animal or vegetable matter and is diffused in the atmosphere and thus affects great numbers of people; or that it may be generated in the body of the diseased, or dead subject, and contracted by those

persons who are exposed to, or come in contact with it, and that the life, or germs found present in such cases, are spontaneously generated in the body and are the effect, and not the cause of the contagium. Dr. Bastian, of Germany, and Hughes Bennett, of Great Britain, not only believed this but made many experiments with various animal and vegetable infusions, to prove that life can be started from matter entirely destitute of life, and so conclusive did the experiments appear that many were induced to accept the theory as true. But these experiments were shown to be defective, and that the life that swarmed from the infusions, did not come from the inert matter, but from the minute and invisible germs in the air.

While these views are still entertained by many authorities, they are antagonized by the ablest scientific men of the world; they have proven from their recent discoveries that some of the epidemic, or infectious diseases start from germ life, and so convincingly have they shown this, that perhaps the majority of medical scientists now believe that all of these diseases originate from the same cause, and that no infection can start from matter that is destitute of life.

It was Schwan, of Berlin, who some years ago discovered that the yeast-plant was a living vegetable germ, and that when plowed in favorable conditions reproduces itself indefinitely, and that if the germ or life in the yeast is destroyed there can be no fermentation; he also showed that meat exposed for any length of time to an absolutely pure air will not take on putrefaction, but that when exposed to the life that is in the air putrefaction soon follows.

But the discoveries of M. Pasteur, of Paris, were the first that aroused general attention to the subject of germ life. It was in 1865 when he commenced a series of experiments which have culminated in placing his name in the front rank of original investigators. It may not be generally known that the silk culture has for a long time been one of the leading industries of France; in 1853 it produced a revenue of one hundred and thirty million of francs, in 1865 it was reduced to eight million of francs, the cause was supposed to be some disease which affected the silk-worm and finally destroyed it; large sums of money were offered by the government to any one that could find a remedy that would stop its ravages, but all efforts proved of no avail. Pasteur at this time commenced his work to unravel the mystery. After long study and many experiments he at last discovered with the aid of his microscope, that the cause of the disease was a living parasite; he found that the parasite first attacks the moth, the moth lays the egg which being affected, is transmitted to the now forming silkworm; he communicated his discovery to the Academy of Sciences at Paris, and by his careful selection of healthy moths and eggs, this great industry was restored to its former prosperity. Three years before this time his attention had been directed to a disease prevailing in the vineyards of France: the grapes became diseased, and the wine produced from them was so injured as to cause a loss to the country of many millions of dollars. He discovered the cause to be a parasite; after learning this, he found from further experiments that by heating the wine to temperature of 50° C. its purity was fully restored.

Tyndall, of England, had for a time halted in opinion between these contending forces, but Pasteur's experiments added to the previous discoveries of Schwan led him as a true scientist to make experiments for himself. They were carried on for a long time, not only in his laboratory but in different parts of England and Scotland, in valleys and on the tops of the highest mountains. He selected different animal and vegetable substances, many of them the same that were used by Dr. Bastian and Hughes Bennett in their experiments; they were each separately digested at a temperature of 120° F., for from three to four hours, then filtered and boiled, and each separate infusion was poured in glass jars so carefully as to admit of no air, and hermetically sealed. He found that these jars could be indefinitely exposed, and the infusions show no signs of life, but continue to retain their clearness and purity; one hundred and twenty of these jars were exposed for three years, showing no trace of life; but when the smallest opening was made, so small that the natural eye could not detect it, and the air with its living matter admitted for the shortest time, in from two to four days the infusions became cloudy and soon swarmed with bacterial life. As the result of those prolonged experiments he affirms "that in one day life has never been known to arise independently of pre-existing life, I belong to the party which claims life as a derivative of life." His experiments have been confirmed by Pasteur, Huxley, Helmholtz, and others.

About this time Lister, the great surgeon of London, began to see that this germ-life must be the great cause that prevented the healing of wounds in his hospital practice; he changed his course, and by the introduction of his antiseptic treatment, has brought about a revolution in surgical practice, and such fatal complications as erysipelas and hospital gangrene will become almost unknown when his instructions are fully carried out. Had this treatment been introduced earlier, thousands of lives would have been saved, during the late war, in the large and crowded field hospitals of this country.

At this stage of medical progress the scientific world has reached a point of absorbing interest. The microscope, that wonderfully perfected instrument, has revealed to the gaze of man its countless array of infusorial life, and is wresting from nature many of her hidden secrets. Pasteur and Koch, Cohn, Klebs, Crudeli, and other careful investigators believed from their experiments that many of the infectious diseases of the human race and animals are caused from germ-life, but it was Koch, of Germany, who scored the first great success in discovering the parasitic cause of disease in the human subject; he had previous to this detected their presence as the cause of splenic-fever in cattle; after completing his study of this disease he turned his attention to tuberucular consumption and discovered what he calls a "rod-shaped bacillus" in all genuine cases of that disease; from long and repeated experiments upon different animals he at last became convinced that these organisms are the cause, and that they occur constantly in persons who are suffering from the diseases and that they are distinguished by peculiar features from all other minute organisms. He says that "it

is a specific infectious disease caused by a specific micro-organism which constitutes in fact the true tubercular virus."

These views are opposed by some of the ablest men in the medical profession, among them Dr. Formad, of Philadelphia, who admits the presence of the germs, but believes they are the effect and not the cause of the disease; the discussion is still going on but the most distinguished pathologists of both hemispheres acknowledge his discovery and accept his conclusions; the veteran Austin Flint, Sr., of New York, being one of the number. At the last meeting of the American Medical Association at Washington, as its president, he announced his concurrence in Dr. Koch's discovery.

But we must again turn to Pasteur, of France, who has taken another step forward in this new field of study. Over four years ago he commenced his work to discover the cause and prevention of hydrophobia; his past experience had led him to believe that in the virus of many of the infectious diseases was to be found the means to guard against the infection; that is to say—by introducing into the body of a healthy animal by inoculation a similar, but attenuated virus, it will prevent the danger of the infection when exposed to it. He commenced his experiments in the following way: A monkey was selected and inoculated with the microbe, or virus of a rabid dog; the animal died, he repeated the experiment by taking the virus from the dead monkey and inoculating a second one, taking the virus from this second one he repeated it upon a third monkey, and then found that it was almost innocuous; he then took the weak virus and inoculated a rabbit, and found its power increased, this last was then used upon a second rabbit, and he found its intensity still more increased, the virus from the last was then used upon a third and fourth rabbit until it had reached its greatest strength. With this modified virus, varying in degrees of strength, he inoculated healthy dogs, then after a time exposed them to the bite of the rabid animal, and found that the bite did not affect them; he then selected forty-two healthy dogs, twenty-three of which were inoculated with this modified virus; they were after a time allowed to be bitten by the rabid dog; not one of them had the hydrophobia; he now exposed the nineteen dogs that had not been protected by inoculation; out of the number fifteen soon became rabid. After fully satisfying himself as to its protective power, he made his report to the Academy of Sciences at Paris, he also attended the meeting of the International Medical Congress at Copenhagen, Denmark, and on the 11th of last August that body listened to his address, and he repeated the experiments leading to his discovery in detail; the latest reports from Paris, recount his final and complete triumph. A commission of seven members was appointed by the Academy of Sciences to fully examine into the merits of his discovery; the commission repeated his experiments, and have made their report, that he has succeeded in protecting against the virus of hydrophobia.

Now many, at first thought, may regard this discovery as of no great significance, because so few persons are bitten by the rabid dog, but when we reflect that it establishes a great law which further experimentation may show is appli-

cable to other infectious diseases; it makes the question one of the greatest importance. We know now that small-pox originates from germ-life and that the vaccine virus, by inoculation prevents it; we have every reason to believe that yellow-fever comes from the same cause and that it is this germ-life that gives it its deadly specific contagion. Dr. Freire, of Rio Janeiro, Brazil, who has had much experience with yellow-fever, claims that he has discovered the microbe of that disease, he reports that he has inoculated four hundred persons with the attenuated virus, and that they remained protected when exposed to the disease. Further reports upon this subject are looked forward to with great interest.

When Hahnemann, the founder of the homeopathic system of medicine announced his theory of similars or "like cures like" almost one hundred years ago, it met with bitter opposition and ridicule from the great body of the medical profession in Europe and in this country, opposition on account of the principle of the theory, and ridicule because of the great attenuation of his remedies; were he able to rise from the slumbers of near half a century he would no doubt be much surprised as well as gratified to find that the foremost leader of medical thought in the world, has by the most laborious study demonstrated *as a great truth* that the cause that will produce a disease will, if attenuated, and used by inoculation in a healthy subject, remove the condition which gives rise to the disease.

But it will be seen that while Pasteur's experiments give great weight to the theory of Hahnemann, that his attenuations are not as great, and that when carried beyond a certain degree of strength, the virus loses it power to protect against the original cause.

In further confirmation of the germ origin of disease we have the testimony of Dr. Crudeli, of Rome, Italy. In his address before the late Medical Congress upon malaria, he shows from his experiments with other co-workers that the cause is a living specific ferment, contained in the soil, and that three conditions are necessary to its production "first, the proper temperature; second, humidity of the soil; third, the direct action of the oxygen of the air, acting upon the vegetable ferment; these conditions acting together will increase the ferment and cause its depression in the surrounding atmosphere." In his experiments covering a period of over five years, he found that the germs were in the air, the soil, and in the blood of the subject suffering from malaria.

The germ cause of disease has also been found in purulent ophthalmia, an infectious disease of the eye, occurring in new born children, as shown in a translation from the French by Dr. Tiffany of this city, and published in the *St. Lonis Medical Journal* for August. As the result of this discovery, the disease has been almost extirpated in those hospitals, where the treatment for the destruction of the parasite has been adopted.

But general public attention had not been directed to this subject until the recent disclosures of Dr. Koch in his study of Asiatic cholera, it was natural that the appearance of this disease in France would arouse the fear, and excite the curiosity of the people on both sides of the Atlantic. It may be known to most of your readers, that France and Germany each sent a commission of medical

men to Alexandria, in Egypt, to ascertain if possible the cause of the disease; during the prosecution of their work one of the members of the French commission died; this unfortunate event put a stop to their work. The German commission, led by the indefatigable Koch, not satisfied with the study of the disease in Egypt, went to the cities of Bombay, and Calcutta, in India where it was confronted in its original home. When the cholera broke out at Toulon, and Marseilles, in France, the commission went to those points, to learn whether it was the same disease that prevailed at Alexandria, and in India. After spending some time at these places, the commission returned to Berlin. Dr. Koch was invited to meet in conference with the members of the Imperial Board of Health, the object of the meeting being to get his views of cholera; he explained at some length the work that had been accomplished; he discovered the comma-shaped bacillus, or a parasite of a comma shape, which he found much smaller than the rod-shaped bacillus of tubercular consumption; he not only discovered this, but he found that they often form into long spiral curves which he called "spirillum." Under favorable conditions these organisms grow rapidly, and when cultivated, and seen in one drop of meat infusion under his microscope they swarm in great numbers; they not only attain their growth rapidly, but they as quickly die; there are many agents which he found destructive to these germs, as camphor, carbolic acid, quinine, sulphate of copper, but by far the most destructive is corrosive sublimate; he says that they are readily killed by drying. He also says that the cholera bacillus is never found in connection with any other disease than cholera, and he is firmly convinced "that the cholera process and the comma bacilli are intimately related, and there is no other conceivable relation, but that the bacilli precede the disease and excite it." For my own part said he "the matter is proved that the cholera bacilli are the cause of cholera."

He further says that the virus can be multiplied indefinitely outside the body, but does not think it can grow in rivers, or streams where the current is rapid, but it grows at mouths of drains, standing or stagnant water, and that any animal or vegetable refuse in such places will not only hold but nourish it; subsoil water also propagates it from the same cause; the disease has a local habitation and that "all great epidemics of cholera begin in South Bengal where the conditions for the development and growth of the bacillus are most perfect.

It is only upon the theory of the germ origin of cholera that we can satisfactorily explain the outbreaks that occur in isolated places, or particular districts in a city, or the country, and while it may attack high or otherwise healthy places, it is well known that the fatality is much greater in low, damp and impure localities. It will be recollected by some of the older citizens of Kansas City that when the cholera prevailed here in 1866 it was almost entirely confined to places where all the surroundings were favorable to its spread, and where the water supply was mostly from springs, or surface wells. In one large house near the Missouri River with many occupants, the disease broke out and many died, the house was vacated and supposed to be cleansed and disinfected, it was soon after reoccupied, when the disease broke out afresh, and with as great fatality as

it first. From our experience with this disease in the past, and from the ravages which it has already made in parts of France and Italy, we have reason to believe that it will not only spread over Europe, but that it will reach this country, if urgent measures are not taken to arrest it; as the season is far advanced it may not touch our shores until the early part of next year; the different cities on and near the Atlantic Coast have organized strict sanitary regulations to prevent it. Has Kansas City been placed in a proper state of defense? Under the able management of the head of the health department, the health of the city for the last two years has been very good, the annual mortality list is so low as to make it almost unexampled, but there remains much to be done to guard against epidemic disease. His timely warnings and suggestions should be heeded and his arms strengthened with the means necessary to place it in a good sanitary condition. If this is not done, the city may suffer a calamity in loss of life and business such as it has never experienced.

The field of medical investigation which we have briefly presented to your view in this paper, is one of great extent; and the facts, but recently developed are too complex to be fully settled by the labors of a few men. Pasteur and Koch have, by their discoveries, already placed their names high upon the scroll of fame, they have opened the way through which will continue to flow the richest benefits to the health and happiness of the human race; but it should be recollected that new-born truths encounter opposition, and cannot in the very nature of the mental constitution of men, be generally accepted in a day.

The signs of the times indicate that the different branches of scientific medicine will be consolidated and crystalized into one harmonious system, the rough places will in time be made smooth. The various processes that will bring about this desirable result are quietly at work, and will make it, at no distant day, an accomplished fact.

KANSAS CITY, MO., October, 1884.

CONCLUSIONS REGARDING THE WARING SEWERAGE SYSTEM.

(*Translation from M. Pontzen.*)

The first application of sewerage according to Waring's system, made in Paris in 1883, in a quarter where all of the unfavorable conditions are combined, has been a complete success.

The establishments drained by Waring's system leave nothing further to be desired in a sanitary point of view, and the *ensemble* of the drainage works has not, during the five months it has been in operation, given rise to the least complaint. The water-closets in the courtyards are no longer offensive, and their presence would not be suspected, the conduits of the system have never required any special cleansing, no deposit has been formed in the collecting sewer in the Rue de Rivoli at the mouth of the main, and the air in this main, constantly

renewed and passing only over recent matters moving in a rapid current of water, has no odor.

The officers of the city and the members of the Municipal Council, more particularly interested in the improvement of the sewerage of Paris, have watched the experiment with interest, and I am permitted to say that the good services rendered by the combined arrangements introduced by Mr. Waring contributed largely to the influence which led the Municipal Council to decide, in its session of the 11th of April, 1884, that the preliminary official inquiry which is about to be made, and which is the prelude of a definite decision as to the method of sewerage for Paris, should relate both to the direct discharge of household wastes into existing sewers, and to their removal by separate sewers.

It seems certain that within a short time the entire suppression of vaults and movable receptacles for fœcal matter will be decreed, as well as those which receive and retain excremental matters as those which attempt a division, and are intended only to retain the solid portions; and that the immediate removal of all excremental matters and household liquids will be accomplished by their direct discharge beyond the limits of the city.

These substances will be discharged *into the sewer*, wherever the condition of the sewers is suitable; they will be sent *through the sewer*, that is to say, by special conduits located wherever possible in the interior of the large sewers, where their immediate delivery into the sewer itself would not be admissible—these special conduits to deliver *into* the sewer as soon as a point is reached where the necessary conditions for the rapid and complete removal of the discharge of such affluents is assured.

This is one of the great advantages of Waring's system of sewerage, that it can as well be established in isolated sections, constituting an auxiliary and an economical complement of the great system of sewers suited to receive fresh fœcal matter and household waste, as it can, by itself alone, be extended for the complete drainage of whole quarters or of entire cities.

Whatever may be the extension of a series of sewers according to Waring's system, it retains always, by reason of its exclusion of storm-water, the great advantage of requiring only small diameters and reasonable inclinations in which the volume of flow undergoes only slight variations, and for the cleansing of which relatively small quantities of water suffice.

The establishment and maintenance of a system of sewers according to Waring's system has therefore in all cases the advantage of being economical.

PARIS, May, 1884.

GEOLOGY AND MINING.

THE BURLINGTON GRAVEL BEDS.

PROF. JOHN D. PARKER, U. S. A.

During the summer of 1883, some students of the Kansas Agricultural College, while on a geological excursion in Southern Kansas, found on Shell Island, which is located a little below Burlington, a piece of Burlington gravel containing a trilobite. The specimen is a cast, small but quite perfect, and is evidently *in situ*, that is, it belongs to the gravel. This specimen was submitted to Prof. O. St. John, the accomplished palæontologist of the United States Survey, who identified it as belonging to the genius *Phillipsia*, of the Upper Carboniferous. This find is important, due to its bearing on the geological horizon of the Burlington gravel beds.

Prof. Schaeffer, of Cornell University, found in the gravel, a specimen of which was sent to him for examination, a large number of small silicified corals, the two genera *Fenestella* and *Tremotopora* being readily distinguishable. These genera belong to the Silurian. The late Prof. Mudge, who was probably more familiar with Kansas geology than any other person, on a casual examination of the Burlington beds in the fall of 1871, expressed the opinion that they were the result of modified drift. The beds extend over a large territory passing over the divide between the Neosho River and the Verdigris, and the gravel is found as far north as Emporia, and as far south as Oswego. I have found the gravel in walks at Topeka and Leavenworth. The Kansas River may have been the general terminus of glacial action southward in the State of Kansas, but we find boulders farther south, and possibly there might have been enough glacial action over the region of the beds to have deposited them. Or, perhaps, the drift may have been modified, and the beds transported to their present position by subsequent agencies.

Prof. O. St. John is of the opinion, however, that the beds are to be considered of local origin, and to have been derived from the Carboniferous. We give the following extract from a private letter of this eminent palæontologist, which indicates his views on the subject:

"In regard to the chert gravel from the Neosho Valley near Burlington, Kansas, it is perfectly safe to say it comes from the chert beds overlying the heavy building limestone series, well up in the Upper Coal-Measure series; the same that crowns the highland eminences south of Manhattan, and thence extending south-southwest into the so-called Flint Hills east of the Arkansas Valley, in the southern central portion of the State. It may not be strictly a "glacial" gravel, although these particular deposits might well have in part been the result

of glacial agencies; but they are to be regarded as of a local origin, as we can distinctly trace them to their native ledges only a few miles to the west or northwest of their present position in the gravel deposits, to which they might have been transported by the agency of ordinary currents. But as we do find unmistakable evidence of true erratics, or traveled boulders, as far south, at least, as the divide between the Kansas and the Neosho, it is altogether likely much of this chert gravel was transported by the same agency that brought the quartzite and the boulders from their northern home, hundreds of miles away, to their present resting place, in the superficial deposits of central Eastern Kansas. As you request, I have identified the fossils contained in the chert quartz, from which you will find they are all of Coal Measure age, and identical with forms occurring in the great chert beds, *in situ*, in the aforesaid highlands."

The Burlington Gravel Beds, in an economic view, have recently come into prominence, and will undoubtedly play an important part in furnishing Macadam for the streets of our cities. and gravel for ballasting railroads, and it is of interest to scientists to know from what geological formation these immense deposits have been derived. Such questions would be authoritatively settled by a scientific survey of the State of Kansas, during which geologists would have ample time and means for careful examinations and mature opinions.

The Legislature of Kansas cannot much longer put off the geological survey, when such vital interests are at stake as the development of the natural resources of the State. There is also a demand on the part of the most intelligent citizens of the State, that such a survey shall be made at an early day.

THE MINING OPERATIONS OF THE ROMANS.

Before the antiquarian section of the Royal Archæological Institute, which has just been holding its annual meeting at Newcastle-on-Tyne, the Rev. Joseph Hirst, of Wadhurst, read a paper on this subject. He said: As the Romans gradually extended their conquest over the world, they became more and more aware of the immense increase to their wealth that might be derived from skillfully conducted mining operations. Indeed, the desire to obtain possession of such countries as yielded most abundantly the various metals that were required for objects of use or luxury seemed to have led them to push their conquests in certain specified directions rather than in others. Spain, a country of gold and silver mines, had been called the Indies of the old world. As then Tyre and Carthage had sent Phœnician colonists to establish their factories all along the coast of Africa as far as the Atlantic, who having crossed over into Europe, settled along the far-stretching shores of Spain, and, according to an ancient tradition, pushed their trading outposts as far as the British Isles; so the Romans poured into Spain and reaped there the benefit of the discoveries and of the labors of those who had been before them in the field. Tunnelings of a Phœnician origin might still be seen in that country, and there the Romans found mines of gold, silver,

copper, tin, mercury, iron, sulphur, and salt. During the republic, the State did not occupy itself much with the management of mines, upon which it looked with some disfavor, but left them chiefly to the care of private enterprise. Very little was known about the principles that at that time guided the policy of the Romans in this matter. To one who read the thirty-third book of the Natural History of Pliny, it might appear that indifference to wealth and compassion for their fellow-creatures were at the bottom of this disfavor shown by the Romans in their early history for the work of mines. Various proofs in support of this theory were collected by Barba in his *Métallurgie*. Certain it was, that after the conquest of foreign lands, it was altogether forbidden to work mines in Italy, the mother country. Yet it was remarkable that Pliny should consider Italy the richest country in the world for mineral wealth. However much frugality, sobriety, simplicity of manners, and disregard for luxury might have been virtues practiced by the Romans in the early days of the republic, they but too often yielded in later days to sentiments of a different order. It had been submitted that the restriction limiting the number of men to be employed in the mines of Vercellæ to five thousand, so that no more should be employed in the works at one time by the public contractors, was to prevent the latter from exhausting the mines under the terms and by the force of one agreement. Similar restrictions might have been suggested for similar reasons. Thus it was forbidden by a decree of the Theodosian code to export silver from the rich mines of Sardinia on to the mainland. In course of time, however, the greed of gold, so much inveighed against by the Roman moralists, became universal throughout the empire. Mines and public works of all sorts were seized upon, monopolized, and administered by the State through the agency of public farmers, called technically *publicani*. In the days of the republic, however, only the more important mineral products, whether in Italy or the provinces, were claimed as belonging to the State. Among the works at that time in the hands of the government were, said Marquardt, the gold mines near Vercellæ, in Northern Italy, employing, as already stated, 5,000 hands; the silver mines near Nova Carthago, in Spain, where 10,000 men were employed, and where the daily output was reckoned at a value of 25,000 denarii; the gold and silver mines in Macedonia; and the tin and lead mines near Sisapon, in Bætica, the modern Almaden in Andalusia. The same fate fell to the lot of a great many other mines, which, when let out by the revenue officers to those who thus came to farm them, were deemed capable of yielding a goodly income. The greater portion, however, of the mines throughout the Roman dominion, were still left in the hands of private speculators. In fact, the heavy rent paid by private works was more profitable to the State than the smaller and more precarious sums paid by the *publicani*. Livy made the express statement concerning the iron and copper mines in Macedonia, that they were to be left in the hands of the provincials: while of the gold and silver mines, he said that, on the formation of that country into a Roman province, they were altogether closed, though it was related that some ten years afterward they were reopened and let out in the ordinary way, through the *cen-*

sores to several *publicani.* Plutarch told them that there were in his time throughout Spain and elsewhere gold and silver mines still left in the hands of private individuals which had made those who possessed them as rich as Crœsus had become by his famous silver mines. However, the mines of all kinds, which in the time of the republic were left in the hands of private enterprise, were by the more powerful emperors seized, in part to swell the public revenue, and in part to replenish the imperial private purse. Thus, as time went on, almost all the rich and large mines fell into the hands of the head of the Roman State. Among the imperial possessions must, therefore, be numbered the gold mines in Dalmatia, the silver mines in Pannonia and Dalmatia, the gold mines in Dacia, as well as the tin and lead, not to speak of the gold and silver mines, in Britain. To these might be added the iron mines in Noricum, in Pannonia, and in Gallia Lugdunensis, and the famous copper mines in Cyprus, and those of Bætica in Spain.

The reverend gentlemen here gave a minute and detailed account of all that is known as to the manner in which smelting-furnaces first came to be used and afterward developed. A curious side-light was, he said, thrown upon the whole subject of mining by the unraveling of the somewhat novel information to be gleaned from the ancient inscribed bronze tablets that were discovered in 1876 in a long since disused ancient Roman mine in Portugal. In conclusion, he said there were two distinct ways in which State mines were worked by the ancient Romans. Either they were let by the Roman revenue officers to the *publicani,* or they were kept in the possession of the State and were handed over to the *procurator.* In the first case, the *publicani* themselves undertook to pay the revenue, a fixed sum for the mines they farmed, while they themselves exacted such taxes from the owners or workers of those mines as to leave themselves a margin of profit for their trouble. In the the second case, the imperial procurators either worked the mines themselves at the risk and profit of their masters, or they let them out to companies or individuals, who paid them a certain rent fixed in proportion to the number of men employed in them. The *procurator,* if he worked the mine himself, had under him a slave, who acted as director of the work; a foreman, whose office it was to test and pass the work done; and an engineer, who had charge of the mechanical contrivances. If the *procurator* let the work of the mine out to others, it was either to a single contractor or to a company, who, before the law, had the status of *publicani,* and were often given that name. The *publicani,* however, properly so-called, were mere tax-collectors; the former, or the contractors, were real administrators of the mines. In either case, however, that is, whether the *procurator* himself worked or whether he let out the mine, he had all the accounts of the commercial enterprise to keep in an office established for the purpose. In it the *procurator* had under him a clerk or register-keeper, a steward or disburser, a collector or caster of accounts, and a treasurer. Officers and soldiers were stationed to guard the mine, and to keep order among the workmen. For this purpose, either a tribune, a centurion, or a decurio was detached from his regular corps, and stationed in the mining district, either in a position of independence, or under the command of the *procurator.* The work-

men were either common slaves, hired freemen, soldiers, or convicts and prisoners. During the age of persecution, Christians were sent in thousands to the copper mines of Palestine, and to the various mineral or stone mines of Cilicia, the Thebaid, and Cyprus; as after the taking of Jerusalem, the captive Jews were in part condemned to work in the mines and quarries of Egypt. These poor prisoners were all, like ordinary criminals on being condemned to the mines, first beaten with rods. While at work, their feet were kept in irons; they had to sleep on the bare ground, they were pinched in food, deprived of the use of the bath, and were almost naked. In the subterraneous mines each workman bore a little lamp, fixed to his forehead, to guide his footsteps and serve as a signal to others, while the air and stench of these ill-ventilated caverns were so great that the ill-treated laborers often swooned away. Pliny tells how in his day these poor creatures were kept hard at work day and night, many of them spending whole months underground without ever seeing the daylight; for the burdens they carried on their backs they handed over to others, so that the last of the file came near the mouth of the pit.

The lecturer concluded with an eloquent passage from one of the letters written by St. Cyprian, the great African bishop of the third century, in which many of these particulars were set forth. It was, he said, inscribed to Nemesianus, Felix and other seven, his fellow-bishops, likewise to his fellow-presbyters and deasons, and the rest of the brethren in the mines.—*Engineering and Mining Journal.*

ANNUAL REPORT OF THE DIRECTOR OF THE GEOLOGICAL BUREAU.

Major J. W. Powell, Director of the United States Geological Survey, has transmitted to the secretary his annual report of the operations of that bureau for the fiscal year ended June 30, 1884.

The director says that altogether the topographic field work has been materially increased. The districts in which the work has been most expended are the North Atlantic and the South Atlantic. It has been contracted in the South Pacific and great basin districts.

In the North Atlantic district the work of preparing a topographic map of New England has been initiated, and a single party has taken the field. The work in Massachusetts will be pushed with vigor.

In the South Atlantic district triangulation has been continued in the southern part of the Appalachian region, and five parties have been kept in the field. The areas arranged were comprised in the western part of Maryland, the northern and southern parts of West Virginia, southwest Virginia, western North Carolina, and eastern Tennessee, and the entire area surveyed was about 19,750 square miles. A large scale map of the District of Columbia and adjacent portions of Virginia and Maryland has been commenced. In the Rocky Mountain

district the work comprised the survey of the Elk Mountain district, a completed map of the neighborhood of Denver, and continuation of the surveys of the Yellowstone Park, and the southern plateau region.

In the great basin district a detailed map has been made of the hydrographic basin of Mono Lake for the purpose of exhibiting its remarkable glacic and volcanic features. Besides carrying forward the general survey of the Pacific region, Mr. Thompson has begun and nearly completed a detailed map of Mount Shasta. A field map covering about 24,000 square miles in northern California is now ready for the use of geologists. The survey of the quicksilver districts of California has been completed and detailed maps of several districts constructed.

In geology, Mr. Hague and his assistants have been making a systematic investigation of the physics of geyser action in the Yellowstone Park and studying other natural phenomena. Dr. Hayden has been making a series of examinations along the line of the Northern Pacific Railroad, and initial steps were taken for a study of the natural waters of Montana.

Dr. Peale has carried forward the preparation of a bibliography of the thermal springs of the United States. Prof. Chamberlin has been studying glacial phenomena, Prof. Roland Irving has been classifying the archæan rocks, and Mr. Israel Russell has continued and completed the field examinations of the basin of Mono Lake. Mr. Diller has visited Mount Shasta and the southern portion of Cascade Range in connection with the survey of that range. Mr. McGee has made a thorough geological reconnaissance from the District of Columbia as a center of the interesting zone extending from the upper Hudson to the James River. Mr. Emmons has practically completed the field work in the Silver Cliff district of his economic studies in Colorado, ane will now proceed to the study of the Gunnison region. At present his attention has been turned to problems connected with the water supply of Denver. Mr. Becker has continued his investigation of the quicksilver mines of California and has completed his field work.

While supervising the collection of palæontologic matter, Prof. Marsh has given attention chiefly to the study of the material already accumulated, and the preparation of monographic reports. His last memoir described a remarkable order of birds furnished with teeth, and one now in press describes an order of extinct mammals, the Dinocerata. A third, which approaches completion, treats of the Saurpoda, an extinct reptilian order, several species of which were of gigantic size. Dr. White has continued his studies of the invertebrate fossils of the latter geologic ages, following the Missouri River for 1,000 miles in a rowboat. Mr. Ward has undertaken the preparation of a bibliography of palæobotany. In chemic work, a laboratory has been established to meet a demand for the determination of chemic problems. The physical investigations by Dr. Carl Barns have been continued chiefly with a view to the measurement of high temperatures. He has also continued an investigation on the conditions of subsidence of very fine particles suspended in liquids, a subject of great geologic importance.

Mr. Williams' statistics on the mineral production of the United States for the year 1883 will be published, together with those of 1884, in a volume to appear in the spring of 1885.

Mr. McGee and Prof. Hitchcock have been at work upon a preliminary map of the United States, on which will be represented the present status of knowledge relating to areal geology. In this connection a thesaurus of American geologic promotions has been projected, and much work done thereon. With this thesaurus a second map, embracing New York, Pennsylvania, and New Jersey, has been projected. Much work has also been accomplished in the preparation of a bibliography of North American geology.—*National Republican.*

CORRESPONDENCE.

ARCTIC EXPLORATION.

EDITOR REVIEW :—In the August number of the KANSAS CITY REVIEW OF SCIENCE, under the title of "Arctic Corps of Explorers," I advocated a plan of Arctic exploration, which will doubtless save very much of the loss of life and money which has been entailed on the world, by a hundred expeditions, for the last eight hundred years. This plan of employing the Innuits has been in my mind a long time, but as it was, as far as I know, new to the world, I put it forth with hesitation, simply as a germ, for the consideration of practical explorers.

While attending the British Association of Science at Montreal, I fortunately met the Arctic explorer Lieut. P. H. Ray, U. S. A., at the brilliant reception given by Sir William Dawson, and learned from him that he had been using the Innuits in his work of exploration for two years, with the most satisfactory results. It will be remembered that Lieut. Ray led a polar expedition up the western coast of North America about the time that Lieut. Greely departed on his expedition, to plant colonies, on Captain Howgate's plan. Lieutenant Ray employed Innuits on his expedition, during which he never lost a man, but brought back his whole party alive, and in good condition. This very success probably led to very little being said about his expedition, which was evidently conducted on common sense principles, and showed that Lieut. Ray has the personal qualities and practical knowledge of a successful Arctic explorer.

Lieutenant Ray has very kindly sent me the following correspondence, which I take great pleasure in publishing, as he has had a wide experience in Arctic exploration, and has put the plan of employing the Innuits to a practical test:

"Chaplain Parker, U. S. A., in advocating the organization of a corps of Arctic explorers, and in suggesting that the Inu be utilized in the work, takes a step

in the right direction, and while I may disagree with him on many of the points of detail, I fully concur with him in the main, and hope that before many years have elapsed we shall see several such corps in the field, and that the work will be vigorously pushed until many of the problems of meteorology and magnetism are solved. And this work can be done without risk to human llfe, in any latitude heretofore attained, if our people will only learn the habits and customs of the Arctic highlander, and conform to them while in that region. While I am in favor of employing the Inu in every capacity but that of observer, I am not in favor of either educating him, or bringing him down to a lower latitude for any instruction whatsoever. Take him just as he is, in his most primitive condition, with his faculties all sharpened in his struggle for existence, and he is the most useful man the explorer can have, for he can teach us in the art of wood-craft and ice-craft, and he has *inherited* that peculiar instinct of the wild hunter that no man can ever learn, after he has attained maturity.

"We can never hope to make a scientific observer of the Inu, consequently anything we should be able to teach *him*, would only tend to draw him away from his old habits, and to blunt the very faculties we are so anxious to cultivate. For it is an *art* for a man to be able to go into that inhospitable region and maintain himself with comparative comfort without fuel, and without any shelter except such as he can construct from the frozen snow, and if necessary, draw his subsistence from a region that to the inexperienced seems absolutely destitute of animal life. In the region where Franklin's party perished the Inu lives in comparative comfort, and with the death of Jens died the last hope of Greely's starving party, and Schwatka's experience shows what a man can do who will intelligently make use of these people as they are.

"During my stay in the Arctic I traveled over 700 miles by sledge through an uninhabited region. All journeys were made without tents and fuel, a small kerosene stove, that consumed only one gallon of oil every twenty days, being used to melt ice, and I never suffered from cold, and my experience teaches me that the *personnel* for a successful Arctic expedition for scientific research beyond points where a ship can penetrate should be made up in the following manner:

"First. A chief of party who has passed at least one year north of the Arctic Circle among the Inu.

"Second. The staff of scientific observers necessary to carry on the work contemplated.

"Third. One competent cook.

"Fourth. One Canadian half-breed to each sled equipped.

"Fifth. One Inu and wife to each sled, the man to hunt, guide and build snow huts; the woman to keep fur clothing and foot-gear in order.

"With such an outfit, the region to which an energetic man can penetrate is limited only by the shores of the eternally frozen sea"

P. H. RAY.

WASHINGTON, D. C., October 9, 1884.

In conclusion, I would venture to suggest, before any more costly expeditions are sent out, probably to be sacrificed amidst polar snows, that Lieutenant Ray be put at the head of a comparatively small and inexpensive polar expedition, and empowered to employ the Innuits in accordance with his plan published in this article. Let us prosecute arctic exploration *on common sense principles*, and save any further unnecessary loss of valuable lives and expenditure of such princely sums of money. The questions lying around about the polar regions are of great value to science, but they can all be solved without such a fearful loss to all enlightened nations as has been entailed for the last eight hundred years.

JOHN D. PARKER.

FORT HAYS, KANSAS, October 15, 1884.

THE COLEOPTERA OF KANSAS.—A CORRECTION.

WARREN KNAUS.

In the April number of the REVIEW, in the article on the "Distribution of the Coleoptera of Kansas" the statement is made that in the number of species and varieties, Kansas is surpassed only by Michigan with thirty-five hundred species, and by the District of Columbia with twenty-six hundred. The statement in regard to the number of Michigan coleoptera was based on the "Catalogue of the Coleoptera of Michigan" by Messrs. Hubbard and Schwarz. My attention, however, has been called by Professor Snow to the fact that the above catalogue is of the upper and lower peninsulas separately, and that consequently, many species are given twice. This I had overlooked, so that my estimate of thirty-five hundred species is almost one-half beyond the actual number in the catalogued list. Kansas therefore stands at the head of the States in the list of beetles, and is surpassed only by the little District of Columbia, whose beetle fauna has been carefully worked up by the veteran entomologist, Henry Ulke, of Washington City.

SALINA, KANSAS, September 6, 1884.

BOOK NOTICES.

REPORT OF THE COMMISSIONER OF EDUCATION FOR 1882–83: Hon. John Eaton. Octavo, pp. 1165. Government Printing Office, 1884.

The thirteenth Annual Report of the Commissioner of Education, just issued, is fully equal to its predecessors in point of interest, in the importance of subjects discussed, their methodical arrangement, and wise treatment, while the informa-

tion presented is of much more recent date than that usually given in reports whose information is collected from such a vast territory and through so many instrumentalities, covering, as it does, the year closing June 30, 1883.

Little space is given in the report to a statement of the general work of the office aside from the summary of educational data which is prepared annually, as anything like a full statement of such general work would require more space than the Commissioner has at his disposal.

The contents of the appendix consist of abstracts of the official reports of the school officers of States, Territories, and cities, 314 pages, and statistical tables relating to education in the United States, 548 pages. These with the Commismissioner's report proper (293 pages) and the index (10 pages), make up a volume of 1,165 pages.

The following circulars of information have been printed and distributed since the enumeration in the previous report:

No. 1, 1882. The inception, organization, and management of training-schools for nurses. 28 pp.

No. 2, 1882. Proceedings of the Department of Superintendence of the National Educational Association at its meeting at Washington, March 21–23, 1882. 112 pp.

No. 3, 1882. The University of Bonn. 67 pp.

No. 4, 1882. Industrial art in schools, by Charles G. Leland, of Philadelphia. 37 pp.

No. 5, 1882. Maternal schools in France. 14 pp.

No. 6, 1882. Technical instruction in France. 63 pp.

No. 1, 1883. Legal provisions respecting the examination and licensing of teachers. 46 pp.

No. 2, 1883. Co-education of the sexes in the public schools of the United States. 30 pp.

No. 3, 1883. Proceedings of the Department of Superintendence of the National Educational Association at its meeting at Washington, February 20–22, 1883. 81 pp.

The following bulletins have also been issued: Instruction in morals and civil government. 4 pp. National Pedagogic Congress of Spain. 4 pp. Natural Science in secondary schools. 9 pp. High schools for girls in Sweden. 6 pp. Comparative statistics of elementary, secondary, and superior education in sixty principal countries. Sheet. Planting trees in school grounds. 8 pp.

In addition to these publications a special report of three hundred and nineteen pages on "Industrial education in the United States" was prepared and printed in compliance with a resolution of the Senate.

The number of copies of each circular or bulletin issued has been increased to supply the correspondents of the office, and several of those most in demand have been reprinted.

As a matter of interest to our more immediate subscribers we note that,—

"The schools of Missouri seem to be in a very prosperous condition, al-

though the statistics are far from complete, as many counties failed to report fully. There were 18,239 more pupils in attendance at the public schools, which were more numerous by 137, the buildings used for school purposes by 328, and additional sittings by 11,573. Teachers numbered 1,306 more; receipts increased $257,016 and expenditures $601,046. An apparent decrease in attendance of colored youth at school is explained by the fact that thirty-two counties did not report. Eighteen fewer schools for colored youth are mentioned."

Also that,—"Very gratifying progress in school work is apparent in Kansas in 1881–82. Increases are noted in children of school age, in enrollment, in average daily attendance, in school districts organized and reporting, in districts with three months' school or more, in the average length of school term, and in the number of school-rooms. The women teaching received $1.46 more monthly pay on an average. The receipts and expenditures of public schools increased, the former by $228,458 and the latter by $197,839. An increase of $32,109 in the amount of available school fund was also reported."

The Commissioner recommends among other things:

1. That the office of superintendent of public instruction for each Territory be created, to be filled by appointment by the President, the compensation to be fixed and paid as in the case of other federal appointees for the Territories.

2. That the whole or a portion of the net proceeds arising from the sale of public lands be set aside as a special fund, the interest of said fund to be divided annually pro rata among the several States and Territories and the District of Columbia, under such provisions in regard to amount, allotment, expenditure, and supervision as Congress in its wisdom may deem fit and proper.

3. The enactment of a law requiring that all facts in regard to national aid to education and all facts in regard to education in the Territories and the District of Columbia necessary for the information of Congress be presented through this office.

4. An increase of the permanent force of the office. The experience of the office indicates clearly that the collection of educational information and publication of the same, as required by the law regulating it, cannot be properly done with the present limited clerical force.

HISTORY OF THE REPUBLICAN PARTY: By Frank A. Flower. (Illustrated.) Octavo, pp. 623. Union Publishing Co., Springfield, Ill. For sale by M. H. Dickinson.

This work is essentially historical, and, while necessarily partisan in its character, is accurate and authentic. It commences with the origin of the Republican party and traces its growth, with biographical sketches of its early leaders, from its inception down to the present day. In addition to this it is a compendium of information upon all political movements with the past quarter of a century, including the salient features of the various campaigns, accounts of Repub-

lican conventions, the administrations of the several Republican presidents, with copious tables of statistics of a valuable nature.

While intended as a work of permanent value and not merely as a campaign document, it will be found very useful to speakers and writers for the latter purposes during the campaign and as a reliable book of reference in their libraries afterwards.

LEGENDS, LYRICS AND SONNETS: By Frances L. Mace. Second edition. 12 mo., pp. 227. Cupples, Upham & Co., Boston, 1884. For sale by M. H. Dickinson. $1.25.

These poems have been very favorably received by the critics, as well as by ordinary readers, and it is not too much to say that many of the pieces give proof of a true poetic spirit, if not of real genius. No one can even glance through the book without acknowledging this, and the reader who devotes proper time to their perusal will recognize it more and more as he becomes familiar with the author's style and tone and enters into her spirit. It is certainly a book that will increase her reputation as a sincere writer and true poet wherever it is read.

THE MAN WONDERFUL IN THE HOUSE BEAUTIFUL: By Chillon B. Allen, M. D., and Mary A. Allen, M. D. 12mo., pp. 370. Fowler & Wells, New York. For sale by M. H. Dickinson. $1.50.

The authors of this book, which is a treatise on physiology and hygiene, are husband and wife, both doctors and both former teachers. They have adopted the above title and thrown the text into the allegorical form as a more attractive and *ad captandum* means of securing readers who would lay aside unread a work on the same subjects under the ordinary title.

The human body is "House Beautiful," and its inhabitant the "Man Wonderful." The building of the house is shown from foundation to roof, and then we are taken through the different rooms, and their wonders and beauties displayed to us, and all this time we are being taught—almost without knowing it—Anatomy, Physiology, and Hygiene, with practical applications and suggestions.

We are then introduced to the inhabitant of the house, "The Man Wonderful," and learn of his growth, development, and habits. We also become acquainted with the guests whom he entertains, and find that some of them are doubtful acquaintances, some bad, and some decidedly wicked, while others are very good, company. Under this form we learn of food, drink, and the effects of narcotics and stimulants.

The Table of Contents by chapters has these striking subjects: The "Foundations," which are the bones. The "Walls" are the muscles, while the skin and hair are called the "Siding and Shingles." The head is an "Observatory," in which are found a pair of "Telescopes," and radiating from it are the nerves, compared to a "Telegraph" and "Phonograph." The communications are kept

up with the "Kitchen," "Dining-Room," "Butler's Pantry," "Laundry," and "Engine." The house is heated by a "Furnace," and which is also a "Sugar Manufactory." Nor is the house without mystery, for it contains a number of "Mysterious Chambers." It is protected by a wonderful "Burglar Alarm," and watched over by various "Guardians." A pair of charming "Windows" adorn the "Façade," and a "Whispering Gallery" offers a delightful labyrinth for our wanderings.

FORESTRY OF NORTHERN RUSSIA AND LANDS BEYOND: Compiled by John Croumbie Brown, LL.D. 12mo., pp. 279. Edinburgh. Oliver & Boyd, 1884.

FORESTRY OF THE URAL MOUNTAINS: John Croumbie Brown, LL.D. 12mo., pp. 182. Edinburgh, 1884. Oliver & Boyd.

The above named volumes make up thirteen works upon forestry by this indefatigable investigator and writer upon this subject, most of which have been noticed in the REVIEW during the past four or five years. They are all designed to supply British students of forestry with valuable information obtained by the author from foreign travel.

The awarding committee of the International Exhibition of Forest Products, and other objects of interest connected with forestry, selected to award premiums on forestal literature, spoke in high terms of the works of Dr. Brown, who, being a member of the committee, could not compete for the premium. Each of Dr. Brown's works is complete in itself, though an integral part of a series of volumes in course of publication, designed to familiarize students in forestry with the applications of forest economy in different lands; and Dr. Brown's personal acquaintance with the systems pursued in most countries of the continent of Europe was found of special service to the committee.

In a prairie country like that west of us a complete knowledge of forestry must necessarily be found of the greatest advantage, and we cannot avoid recommending to the State Boards of Agriculture of Kansas, Nebraska, Colorado, etc., the purchase of a full set of these works.

A MIGRATION LEGEND OF THE CREEK INDIANS: By A. S. Gatschet. Volume I. Octavo, pp. 251. Published by D. G. Brinton, Philadelphia, 1884.

This is Volume IV of Brinton's Library of Aboriginal American Literature, and is the result of protracted and careful study of the language and ethnology of the Creek tribe and its ethnic congeners.

The story related in these pages is, as its author states, wholly legendary, in its first portion even mythical; it is of a comparatively remote age, exceedingly instructive for ethnography and for the development of religious ideas; it is full of that sort of *naïvete* which we like so much to meet in the mutual productions

of our aborigines, and affords striking instances of the debasing and brutalizing influence of the unrestricted belief in the supernatural and miraculous.

The volume is divided into two parts, the first comprising: The southern families of Indians; I—The Linguistic Groups of the Gulf States; II—The Maskoki Family; III—The Creek Indians. The second part is made up of the Kasi-hta Migration Legends, which includes Indian migration legends, Migration Legends of the Creek Tribes, Tchikillis Kasi-hta Legend, the text and the translation.

Professor Gatschet has for years made the ethnology of our Indian tribes his study, and this volume is one of the results. It evinces great labor in investigating and compiling authorities, as well as in working out his conclusions. The translation of the migration legend is by Dr. Brinton, the accomplished editor of the series above referred to.

ASTRONOMY.

SUN AND PLANETS FOR NOVEMBER, 1884.

W. DAWSON, SPICELAND, IND.

The Sun's usual motion eastward brings it to R. A. 14 hours 29 minutes November 1st, and 16 hours 29 minutes on the 30th. Its declination south on the 1st, is 14° 44′; and 21° 48′ on the last day of the month. The length of days will thus decrease during the month from 10 hours 22 minutes to 9 hours 24 minutes. Sun-spots were numerous in the early part of October; ninety-five being observed on the 2d. But only ten were visible on the 16th.

Saturn rises on the 1st of November about 6:30 P. M. Its declination is 21° 48′ N; nearly as far north of east at rising as the Sun is in longest days. So that this interesting planet is now very convenient for observation. Saturn is now retrograding—moving westward among the stars. It is just north of a small star (Zeta Tauri) and nearly half way from Aldebaran in the big A to the twin stars Castor and Pollux. Jupiter rises near 1 A. M. on the 1st, several degrees north of east; so it is still a morning star; being very bright and conspicuous, a little east of the fixed star Regulus. Although Venus is slowly waning in brightness, it is still a fair rival for Jupiter, and about two hours east of it. The phase of Venus is somewhat gibbous—a little more than half-moon shape. This planet will be near Uranus (about 1° north) in the morning of November 4. The same day Mercury is in superior conjunction with the Sun. Neptune is still about 7° southwest of the seven stars. Mars sets about 6 P. M. in the southwest, hence is of no special interest.

METEOROLOGY.

RED SKIES.

ISAAC P. NOYES.

It is doubtful if anything ever created a greater commotion in the scientific world then the red sky so conspicuous the past year. The scientists almost to a man seem to have found, for them, a reasonable solution therefor in the *dust theory*—dust either from meteors or from the volcano at Java, which occurred the latter part of August, 1883.

I, as a student of the Weather-Map, take exception to this *dust theory* and maintain that this delicate redness in the sky is the result of the presence of a minimum quantity of moisture in the air—and that water and not dust is the cause, and that it is not peculiar to times of meteoric showers or volcanic eruptions, but to those conditions which we term high-barometer, when there is the least possible moisture present in the atmosphere.

The objections to *volcanic dust* and *meteoric dust* are not altogether the same, yet they are similar and in some respects identical. First, as to *meteoric dust:* in the absence of any remarkable display of meteoric showers it could not be from near meteors; and had this phenomenon produced any such effect the dust producing it would have been so plenty all over the surface of the earth as to have left a such mark, or evidence, that it would have been useless to deny that it had occurred, and there being some possibility of this red-sky effect being produced by it. But then showers of meteors as a rule are not so universal in their distribution; they are more apt to be local; and when they do occur they are plainly seen. So this would seem to shut out near or local meteors.

It may be claimed that it came from his distant meteors within the orbit of the earth; that as the earth came around to their point the whole atmosphere would then be affected. In this case the dust would have been so far away that it would have made no difference as to time of day when, with a clear sky, it might have been seen and its effect noticed. It would not have been necessary first to have the Sun go below the horizon. At so great a distance the Sun would shine through it, equivalent to us, perpendicularly to the plane of the earth. This being the case it ought to have given, *if dust would give such an effect,* a rosy tint to the sky at all hours of the day. Again, this effect would only have been for a short time when the earth was passing the locality of these supposed meteors; and then from this distance we would either have had an abundant supply of dust to gather as evidence, or there would have been none at all to have been examined by a microscope; *i. e.* there would be no "half way doings" about it.

For these reasons, and other reasons to be mentioned, I do not believe that it could have come from meteors distant or near.

The volcano at Java, August 27, 1883, being the only *volcanic* dust claimed as having produced this effect, to that we will direct our attention. It is said that it was an immense volcano and that the world never saw such a phenomenon in this department before—it excelled all others—that the air for miles around was thick with dust and ashes; that the dust was thrown 3,000 feet! in the air. From the height at which the dust was thrown it would seem, to one not posted in modern meteorology as revealed by the Weather-Map, and as to the height that the clouds move, that 3,000 feet was a great distance. A monument 600 feet high would be extraordinary and of immense height, but what would such a height be beside a mountain six miles high? The highest clouds, it is said from good authority, move at an elevation of 23,000 feet, or over four miles, showing that the currents of winds are at least that high, and the chances are that they are even much higher. What is 3,000 feet to this? But, it may be asked what has this to do with it? If one will study the Weather-Map and note the storm-centres thereon—how they move, how they create the currents that gather the clouds, that produce the rain, he will see that these storm-centres are located over the world, from 1,000 to 2,000 miles apart, that they travel in belts and on all sorts of lines. That between the centre of the United States and Java there must be at least six of these centres on one line. We cannot, at present, for want of stations, prove how many belts there are between these points, but as near as we can ascertain there must be about three between there and here. At each one of these storm-centres the wind is blowing from all points of the compass, north, east, south and west, at the same time; and, as above stated, these storm-centres affect the movement of the clouds at least to the height of 23,000 feet, and the lighter atmosphere undoubtedly above this point. This being the case, it would be impossible for any material like dust or even a balloon, that could only attain the height of 3,000 feet, to pass over one of these centres or the atmosphere centering to them, and pass on to some remote part of the world. Before we had the Weather-Map we could not be blamed for thinking that our atmosphere followed the surface of the earth around as the water poured on a grind-stone follows the stone around, but it does not. The water on the grind-stone is no parallel.

This dust would be gathered by the first storm-centre within its locality, whether, east, west, north or south; and after it had reached the centre there would not be much dust remaining in the air to be passed on to some other point. It would be precipitated then and there. It might travel 1,000 or 2,000 miles, but would not get beyond that limit. But it is said that dust has been seen in the air and gathered, and is now held as testimony in the case. I have not the least doubt but what a *little* dust can be found in the atmosphere at any time, for the wind is always raising more or less, but this does not reach a very high elevation, at least independent of high elevations. It may be found on a high mountain, but that would be only relatively high.

The great Michigan fire in September, 1881, might be brought forward as evidence of extensive discoloration of the sky by smoke, then the query may be raised: if smoke may thus discolor the sky, why not dust?

If one will refer to the Weather-Map for that date he will see that on that day we had an area of low-barometer on a high line of latitude. The smoke effect took place in the track and within the influence of this "Low," and nowhere else; and it only lasted a few hours, in all about half a day. It did not continue on around the world, west as well as east, and continue for months.

We occasionally have a tornado. The dust raised from this source is local, but at times it spreads over a great extent of territory and fills the air with fine dust, and dust that ought to remain in the air as long as any volcanic dust from Java, and yet who ever heard of this dust for even one day producing a red sky? As to the properties of dust, it will not, even under the most favorable circumstances, compare with water in the power of refraction; as for its power of reflection it must be of very bright surface to produce much effect in this line. Water will produce such effects; the evidence thereof is daily before us; we have but to look at the clouds, at the ocean, and at the rainbow.

In meteorology we have high and low-barometer; the one may be termed the atmospheric-hill, the other the atmospheric valley. "Low" or low-barometer is the is the agent of the storm; the centre to which the winds are gathered. The clouds are being formed wherever there is heat and moisture; as the clouds are formed the winds carry them along towards "Low." On the surface of the earth this movement is from the "High" to the "Low," the result is that there is little moisture at "High," but then it is impossible to remove all the moisture from "High" *and it is just the little, the minimum, which remains that produces the delicate pink or red sky.* In the area of "High" there are few or no clouds present—the sky is clear. The moisture present is so thin that we do not see it when the sun-light is at right angles to the cloud stratum or moisture. It is not until the Sun is below the horizon, when, as it were, we see through this thin atmosphere edgewise, that the effect is produced; also in addition to this the Sun shines up underneath this delicate cloud formation and illumines the under side of it. This is well illustrated by a piece of glass; hold it so the plate or pane is perpendicular to the light and we see no color, turn it edgewise to the light and we have quite a strong green color. We also see this same general effect in the Moon, when it rises of a clear night, while at the horizon, when we see it through the lower stratum of atmosphere, through the atmosphere edgewise, it appears to be of a deep red color; when it has ascended to mid-heaven, if it is a clear night it is of a bright silver-white, yet it is the same Moon that at the horizon was a deep red. The Moon has not changed, it is only the different atmosphere through which it is seen that produces the effect. So there is no doubt as to the power or property of water to produce this phenomenon.

Those who have earnestly supported the dust theory have considered it conclusive that this red-sky phenomenon was seen in "foggy England," and yet a little further on they say that the atmosphere was the while "*remarkably free*

from moisture." A fact is of no value in an argument unless it effects the evidence. How nicely these two facts support the water rather than the dust theory. Seen in "foggy England," *but only seen when there was no fog in the air!* When it was clear atmosphere. Now they cannot have a clear atmosphere even in foggy England without the presence of high-barometer.

This redness may also be produced partly from artificial source. Let the air of an evening be quite thick with moisture; like what it is when the "Low" centre is off to a great distance; not thick enough for a fog but a slight presence of suspended moisture. Let this be over a city or where there is considereable light. The light shining on and through this mosture will produce the same general effect of redness.

The evening of June 12, 1884, in Washington we had a peculiar effect of red sky, only a part of the sky, a space of about 30° was of this delicate pink color, while the rest of the heavens was a delicate green. In the first place it is very queer if this pink or redness is caused by dust that the dust should be so peculiarly suspended in the air, and again that this dust should remain so many months thus suspended.

This peculiar line was evidently caused by the formation of the clouds below the horizon. We cannot prove this but it is the only reasonable cause, and is most reasonable.

Again on the evening of June 28, 1884, ten months from the time of the volcano at Java, we had in Washington, D. C., a most brilliant and magnificent display; the sky was clear, without a cloud; no grander display have we had than this. On all of these occasions the area of high-barometer has been over us. In addition to all this another important fact must not be overlooked. Even when it is quite cloudy, when "High" is upon or near us, this delicate pinkness will occur whenever there is a piece of clear sky, between the heavy cloud patches. This coloration is from the same cause as produces the extended coloring with a general clear sky, wherever there is clear sky, whether in patches or in mass, between clouds, or freedom of clouds, the effect is the same. When in small patches the effect is local, when in mass it is general. When this effect occurs, as to time, its strongest and best exhibition is when the Sun is some distance below the horizon; it shines up and illumines underneath the vault of the grand dome of the heavens above us. The further the Sun is down, until it has passed beyond the limit, the higher up on this vault, or underside of dome, does throw its light. This is conclusive proof in itself that it cannot be the dust from afar; from distant meteoric dust. If it was from near dust, and if dust could produce such an effect, the amount of dust that it would take to produce it would be of such a quantity as to leave its mark upon the earth, a mark that would not be overlooked or slighted.

In opposition to all these facts and impossibilities those who advocate the dust theory have only one point of importance, and that is they say that they have gathered some of the dust and that on examination the particles agree in formation with the particles from Java.

Now in any case of evidence where there were so many strong facts on one side and only one on the other would any jury in the land give a verdict against the side of many facts in favor of the one fact no stronger than any one of the facts on the other side? Would they not be apt to say, if this phenomenon is produced by dust, why not gather more of it—quantites of it—right here when the phenomenon occurs? When the phenomenon continues for month after month, and is so conspicuous and general would they not be apt to hold that this dust ought to be so thick in the air as to cause a universal discomforture therefrom; would they not be apt to require a sample of dust possessing such luminous qualities, not a mere grain or two but a *quantity?* I think they would at least demand this much if not more.

On the other hand there would be no difficulty in proving to them that this phenomenon occurs, every time, under certain conditions of the atmosphere; and only at these times. That moisture is thus suspended in the air, and that it has all the qualities to produce such an effect.

People not familiar with the Weather-Map cannot well appreciate the full force of this presence of delicate moisture. They may think it peculiar not to have it regularly, at stated times, and as much or little one year as another. But herein is one of the special beauties of this wonderful map. It shows us that nature is never twice alike. Here in the United States the year of 1883, as a whole was conspicuous for a prevailance of "High." What were the conditions over the rest of the world we cannot prove, as here, by actual observation, but if a certain condition is the cause of a certain natural phenomenon here it is safe to say that a like effect in other countries will be produced by a like cause, and more particularly so when we have all the indirect proof, sky and color, which is the natural result of this condition.

The areas of high and low-barometer travel around the world in belts. These belts vary in line and form and are never twice alike. The peculiar juxtaposition and course of "Low" and "High" is what makes the variation in our weather. A high "Low" giving us hot, dry weather with occasional local showers; "High" over us giving us cool, pleasant weather that does not require much moisture, for not much is used. In this case the moisture is not taken away, out of the ground, etc., and transported somewhere else, as with high-"Low" and southerly winds over a great extent of country. With "High" the sky is clear and quite free of clouds; there not being much moisture and heat to generate them, nor wind to bring them from afar. What moisture then is present is disseminated to such a degree that the direct rays of the Sun, at right-angles to the earth, does not reveal its presence; it is only when the Sun is below the horizon that its presence is realized.

If this phenomenon is caused by dust it would seem that we ought to have the supply of dust replenished quite often, but we have had no new supply and yet the phenomenon continues.

Unfortunately the Weather-Map is a new thing and the scientific world therefore knew little or nothing about it. Hence it is not surprising that they should

have been thus misled by this great eruption at Java, but now that the phenomenon continues it seems most absurd to hold on to so unsatisfactory an explanation, when we see the many facts that can, mostly through the Weather-Map, be brought to disprove it. This dust theory may have answered very well, like the absurd theories of the weather prophets, for years gone by but for the present, with the light of the Weather-Map it seems too absurd for intelligent persons to believe.

WASHINGTON, D. C., July, 1884.

REPORT FROM OBSERVATIONS TAKEN AT CENTRAL STATION, WASHBURN COLLEGE, TOPEKA, KANSAS.

BY PROF. J. T. LOVEWELL, DIRECTOR.

The usual summary by decades is given below.

TEMPERATURE OF THE AIR.	Sept. 20th to 30th.	Oct. 1st to 10th.	Oct. 10th to 20th.	Mean.
MIN. AND MAX. AVERAGES.				
Min	52.	34.	49.	45.
Max	99.	89.	89.	92.
Min. and Max	75.	61.	69.	68.
Range	47.	55.	40.	47.
TRI-DAILY OBSERVATIONS.				
7 a. m.	64.1	62.6	56.9	61.2
2 p. m.	83.2	79.2	81.9	81.4
9 p. m.	67.6	63.4	62.2	64.4
Mean	71.4	68.4	67.0	69.0
RELATIVE HUMIDITY.				
7 a. m.	79.5	83.1	84.0	82.2
2 p. m.	58.8	48.9	52.8	53.8
9 p. m.	83.8	81.0	80.0	81.6
Mean	78.0	71.0	72.3	73.8
PRESSURE AS OBSERVED.				
7 a. m.	28.880	29.007	29.128	29.005
2 p. m.	28.960	28.985	29.115	29.020
9 p. m.	28.872	29.002	29.124	28.999
Mean	28.873	28.998	29.122	29.008
MILES PER HOUR OF WIND.				
7 a. m.	12.5	14.1	19.2	15.3
2 p. m.	21.2	17.9	14.6	17.9
9 p. m.	11.0	12.4	14.0	12.5
Total miles	3086	3650	2484	10220
CLOUDING BY TENTHS.				
7 a. m.	6.1	5.0	3.2	4.8
2 p. m.	5.3	3 6	2.9	3.9
9 p. m.	4.2	4.0	3.0	3.7
RAIN.				
Inches	4.36	1.58	.47	6.41

The first frost of the season occurred October 9th, a slight white frost which hardly injured vegetation at this place, and there was no recurrence of frost up to the 20th.

The last decade of September was very wet; over four inches having fallen in one rain on the 27th and 28th. The rains of October have not been excessive, but with the previous saturated condition of the soil a small amount has kept the tilled fields very moist, and potatoes have rotted in consequence.

The red sunsets have been scarcely inferior to those of last year at this time, which first attracted the attention of the scientific world. They have seemed most brilliant on those evenings which succeeded heavy rains, and this is another reason for thinking the moisture largely concerned in their production. This of course does not militate against the volcanic dust theory which furnishes the nuclei around which these water particles can condense at high elevation.

ST. LOUIS ACADEMY OF SCIENCE.

The Academy of Science held its first meeting since the summer vacation at Washington University, October 6th. Prof. Nipher read a paper on the relation between the violence and duration of maximum rains.

His data was taken from Dr. Engelmann's observations, lasting over a period of forty-seven years. The violence of the rain is measured by the amount of rain falling per hour. Taking only the heaviest and longest rains during the above period of time, each rain is represented on a diagram by a point, if the duration and violence of the rain are taken as co-ordinates. It was found that rains of great violence lasted a comparatively short time, while gentle rains of a quarter of an inch per hour may possibly last a long time—as much as twenty hours in extreme cases. When all the points representing all the rains had been plotted on the diagram, it was found that a curve passing through the outermost points, representing the rains where the greatest amount of water falls, is an equilateral hyperbola. This means that the duration of maximum rains is inversely proportional to the violence, or that the product of violence into duration is constant. This constant is the amount of water which may fall in a continuous rain, and is, for Dr. Engelmann's series of about half a century, about five inches. A rain of five inches per hour may last one hour, a rain of four inches per hour may last an hour and a quarter, and such a rain Dr. Engelmann observed. A rain of two and a half inches may last two hours, and several such rains were observed. A rain of an inch per hour may last five hours. Each of these cases would be a five-inch rain. For a longer period of time than fifty years it is likely that greater rains than five inches may be observed. The same is to be said if observations are to be taken over a wider area of country. In fact, a rain of six inches in three hours occurred near Cuba, Mo., some years since. This would increase the value of the constant from five to six, but otherwise the relation will probably remain unchanged.

The importance of this law is very great in engineering, where the capacity of sewers, culverts and bridges must be such as to carry the water. A more general investigation, which Prof. Nipher is now making, will determine the relation

between the violence, duration and frequency not only of maximum rains but of all rains.

When this work is completed it will enable an engineer to construct the water-ways of bridges of such a capacity that they will probably stand a definite number of years before they are washed away. This number of years will be so determined that the interest on the invested capital during the probable life of the bridge will equal the possible damage when the destructive flood comes which the engineer determines shall destroy his work. The running expense of maintaining the bridge is then the least possible.—*St. Louis Republican.*

SCIENTIFIC MISCELLANY.

RECENTLY PATENTED IMPROVEMENTS.

J. C. HIGDON, M. E., KANSAS CITY, MO.

GRAPE-CRUSHING APPARATUS.—The object of this invention is to provide a grape-crushing machine of such construction that the body of the grapes after thorough maceration will be immediately separated from the waste portions thereof, and to provide improved means whereby the latter may be expeditiously expelled from the crushing-chamber.

The invention consists of a semi-cylindrical crushing-chamber composed of a pair of semi-circular end pieces, or heads, to the circular edges of which are attached in a slightly separated position—to form a porous bottom, square-ended strips, V-shaped in cross-section.

The said chamber being provided with a suitable supporting frame, across the upper portion of which is journaled a pendent agitator having a serrated crushing head that is adapted to be oscillated within the said chamber in close contiguity to the circular bottom thereof.

A feeding hopper of sufficient capacity is placed directly over the crushing-chamber and the uncrushed fruit is supplied to the crushing devices through an opening controlled by an oscillating plate or valve that is pivoted therein across the framing of the machine.

Across the upper horizontal bars of the said framing is journaled, in suitable bearings, the shaft of the pendent agitator frame.

This latter is provided upon its outer or crushing surface with intersected grooves, or serrations, so that the skins of the grapes may be more easily ruptured thereby and the same having a radial movement corresponding to the internal diameter of the crushing-chamber, it is therefore adapted to be oscillated in very close contiguity to the circular bottom thereof.

The bottom of the said chamber is formed of narrow strips, the sides of

which are chamfered from their inner edge outwardly, only leaving a sufficient portion square at the ends for attachment to the heads of the chamber against the edge of which they are securely clamped by metal hoops.

A section of the bottom is provided with hinges and may be opened downwardly for clearing out the exhausted material. By oscillating the agitator several times by means of a hand-crank fixed upon the outer end of the agitator shaft, the clearing operation will be effectively accomplished.

The feed-opening through which the grapes pass from the hopper to the crushing-chamber, is controlled by an oscillating plate pivoted within the opening and provided with means by which it may be graduated from time to time, as required.

This invention was recently patented by Messrs. William Maerz and J. B. Klumpf, of Kansas City.

WATER-TUBE STEAM BOILER.—This invention relates to such simple improvements upon water-tube steam boilers that the same may readily be constructed at any desired location.

The boiler is especially designed for use in connection with steam heating, as all its parts excepting the castings and the drums may be cut from ordinary steam or gas pipe.

Each section of the boiler consists essentially of either a single or double row of horizontal tubes, preferably the latter, placed in a vertical line with each other and having their front ends fixed within a vertical cast-iron flask that is attached by means of threaded nipples to an intermediate drum situated transversely to the lines of tubes and directly above the said flasks, and to which each vertical flask is connected, at its upper end.

The intermediate drum is provided with a vertical threaded connection by which it is placed in communication with the main steam-drum.

The before mentioned horizontal tubes are cut to such lengths that the lower and the ones of shorter dimensions will, when provided with an elbow be of the desired length for attachment by means of a short vertical pipe or nipple to one of the threaded openings in a corresponding horizontal flask near the end opposite the neck thereof, and the succeeding upper rows progress rearwardly in length, the distance between the centers of the openings in the said horizontal flasks.

Each horizontal flask is, preferably, slightly inclined toward the mud-drum to which they are connected. The said mud-drum is connected with the lower surface of the main steam-drum by means of a single vertical tube of sufficient size.

The elbows, if so desired, may be dispensed with by bending the tube downwardly at the rear ends at a rectangle to the horizontal flasks, to which they may be directly attached by any approved means.

In operation the tubes and the main steam drum being filled with water to the centre-line of the latter, the water in the tubes when heated rises in the verti-

cal ends thereof and moves forward and upwardly through the vertical flasks and the intermediate drum to the main steam drum, thence rearwardly therein and downward to the mud-drum, at which point a considerable quantity of the impurities of the water are deposited, and may be removed, as convenient.

In setting this boiler for steam-heating purposes the walls of the furnace are constructed with an annular air space, within which project suitable deflecting-plates built in the walls for the purpose of detaining the upwardly moving heated air. This latter is admitted through openings near the floor, and controlled by registers situated above the furnace, from which point, after being heated by contact with the walls of the furnace, it is conducted to the room above the boiler, as desired.

The inventor is Mr. J. E. Lewis, of Bowdoin Centre, Maine.

A BUREAU OF SCIENTIFIC INFORMATION.

With a view towards the more general dissemination of the results of scientific investigation, and of facilitating the work of the student in natural history, the following members and officers of the Academy of Natural Sciences have associated themselves into a Bureau of Scientific Information, whose function shall be the imparting, through correspondence, of precise and definite information bearing upon the different branches of the natural sciences. It is believed that through an organization of this kind considerable assistance can be rendered to those who, by the nature of their environs, are precluded from the advantages to be derived from museums and libraries.

As the organization is of a purely voluntary character, it is to be hoped that no unnecessary burden will be imposed upon its members by communications of an essentially trivial nature. All correspondence must be accompanied by a return stamp (two cents).

Joseph Leidy, M. D., Mycetozoa; Rhizopoda; Entozoa; Vertebrate Paleontology, Professor of Anatomy, University of Pennsylvania; President Academy Natural Sciences. Edward Potts, Pond Life; Fresh-water Sponges and Bryozoa. George W. Tryon, Jr., Conchology, Conservator Conchological Collections, Academy Natural Sciences. Benjamin Sharp, M. D., Worms; Annelids; Histology, Professor Invertebrate Zoölogy, Academy Natural Sciencces. G. H. Horn, M. D., North American Coleoptera, President American Entomological Society; Corresponding Secretary Academy Natural Sciences. H. C. McCook, D. D., Ants; Spiders; Insect Architecture, Vice President Academy Natural Sciences. Henry Skinner, M. D., North American Moths, Conservator of Lepidoptera, American Entomological Society. Eugene M. Aaron, Diurnal Lepidoptera, Editor of *Papilio;* Custodian Entomological Section, Academy of Natural Sciences. W. N. Lockington, Echinoderms; Fishes. Spencer Trotter, M. D., North American Ornithology. Thomas Meehan, Exotic and Cultivated Plants, Vice-President Academy Natural Sciences; State Botanist, Pennsylvania. J. H. Redfield,

Ferns and North American Phanerogamic Plants, Conservator Herbarium, Academy Natural Sciences. J. T. Rothrock, Vegetable Physiology, Professor of Botany, University of Pennsylvania. F. Lamson Scribner, Grasses, Secretary Botanical Section, Academy of Natural Sciences. H. Carvill Lewis, Mineralogy; Glacial and Stratigraphical Geology, Professor of Mineralogy, Academy of Natural Sciences; Professor of Geology, Haverford College. Angelo Heilprin, Invertebrate Paleontologo; Physiography; Dynamical Geology, Professor of Invertebrate Paleontology, Academy Natural Sciences; Curator-in-Charge Academy Natural Sciences. D. G. Brinton, M. D., Ethnology; American Linguistics and Archæology, Professor of Archæology and Ethnology, Academy Natural Sciences. Harrison Allen, M. D., Teratology, Professor of Physiology, University of Pennsylvania. J. Gibbons Hunt, M. D., Microscopical Technology, Professor of Microscopy and Histology, Woman's Medical College. E. J. Nolan, M. D., Bibliography of Natural History, Librarian and Recording Secretary Academy of Natural Sciences. Prof. Harrison Allen, Chairman; Prof. Angelo Heilprin, Secretary.

It isto be clearly understood that the scope of the organization does not embrace considerations of a purely professional character—such as mineral or chemical analyses—nor the determination of collections, except by special agreement.

Departments not represented in the above titles will be filled as early as practicable; correspondence pertaining to such should be addressed to the Secretary. In all other departments the respondents may be addressed directly, care of the Bureau of Scientific Information, Philadelphia.

EDITORIAL NOTES.

PROFESSOR G. C. BROADHEAD, of Pleasant Hill, Mo., has been designated by Major Hilder, United States Commissioner for Missouri, to examine, classify, and label all specimens of the ores, minerals and rocks of Missouri that may be sent to him for exhibition at the New Orleans Exposition.

The State of Missouri is rich in various minerals, ores, rocks, building-stones, coal, fire-clay, ochres, fossils, etc. It will never have a better opportunity for publishing this fact to the world and advertising its wonderful natural resources, than in making a full display of them at this great industrial gathering. All owners of mines, quarries and mineral lands are earnestly requested to forward, as quickly as possible, representative specimens of their various products.

Specimens are desired of each kind of ore and their associate minerals, such as *Iron Ores*—hematite, specular and limonite, spathic-iron, clay-ironstone, ochre or paint-stuff—say several specimens of each. *Lead Ores*—including galena, coerussite, pyromorphite, anglesite, or any other forms, with the associated minerals, as calcite, pyrite, baryte, quartz, etc. Also good crystals, or masses of well arranged crystals. *Zinc Ores*—including blende or black jack, smithsonite, calamine, burotite, zinc bloom, and their associated minerals, If possible, a number of nicely crystalized forms from each mine. *Copper Ores*—of the various forms. Also carbonate of lime, or calcite, quartz, barytes,

or heavy spar, gypsum, feldspar, hornblende, asbestos, Wolfram, etc., nitre, or saltpetre, fire-clay, potter's-clay, kaolin, grindstone, gritstone, slate, marbles, polishing-stone, paving-stone, fuller's earth, limestones for making lime, hydraulic cement stone, and building stones of all kinds. The harder stones, such as granites, sandstones, limestones, etc., should be in cubes of one foot, while marbles, soapstones and slates are better if cut in slabs. The cubes should have one side broken, one side bushed, one hammer-dressed, and one polished.

Specimens of coal should show the thickness of the vein. Of clays and earthy minerals at least ten pounds should be sent.

Specimens should be well wrapped in paper, with a label enclosed indicating the locality, and name of owner or forwarder. Packed in a strong box and filled in with paper to prevent shaking or rubbing, and address to Major F. F. Hilder, St. Louis, Mo.

On October 8th the Missouri River Improvement Commission, consisting of Majors Suter, McKenzie and Ernst and Messrs. G. C. Broadhead and Broatch, met in this city to inspect the river banks and determine what is needed to improve navigation and prevent serious damage to property by the washing of the current. If work can be commenced this fall and continued during the winter, while the river is low and the current comparatively weak, it will probably prove of incalculable benefit; but if postponed until spring the high water will undoubtedly, as usual, undo all that is attempted, even if it does not cut across the narrow neck behind Harlem, and do damage that millions of dollars will not repair.

The total eclipse of the Moon of October 2d, was invisible in this country, but was successfully observed throughout Europe, and proved a most interesting spectacle. The view of the eclipse in London was superb, the atmosphere being phenomenally clear. It began at 9:33 P. M. and ended at 1:16 A. M. Elaborate preparations for scientific observations were made at Greenwich, Paris and St. Petersburg, and they proved entirely successful. At the Trocadero in Paris the public was admitted free of charge and given the use of the telescopes, while the scientific aspects of the phenomenon were explained by popular lectures.

Arrangements are on foot, it appears, for a very comprehensive exhibition of American products and manufactures, to take place in London, in 1885, and the project has been placed in charge of General C. B. Norton, secretary of the recent foreign exhibition in Boston. The idea is a good one, and General Norton, from his experience in the Paris, Philadelphia and Boston exhibitions, should be a good man to prosecute it.

Mr. Jonathan Lidwell, living near Ulmon's Ridge, Mo., found the jaw tooth of a large animal some two or three weeks ago in a spring not more than one mile from the head of the valley. Lately he commenced again to dig around the spring and found six jaw teeth and some bones. The first tooth found weighs three and one-quarter pounds, is nearly twenty inches in circumference and has been nearly a foot long, including the roots. The largest tooth found weighs over five pounds. It is about twelve inches long and four and a half inches thick. The bones found last are a portion of the hip-bones. The diameter of this bone at the joint is about eight inches one way and about twenty inches the other way.

A cable message was received October 15th at Harvard College Observatory, from Dr. Krueger, Kiel, announcing the discovery of an asteroid by Palisa, at Vienna. The position given is as follows: October 14. 4033, Gr. M. T. R. A. 2h. 18m. 26.3s. Decl. + 13° 47′ 7″. Daily motion in R. A. 56s. West, in Decl. 6′ South.

Prof. F. H. Snow, of Kansas University, reports that the month of September was remarkable for its high mean temperature and its extraordinary rainfall. Its mean temperature exceeded that of every other

September in the past sixteen years except in 1881. Its rainfall was three times the average for the month, and nearly three inches greater than that of any previous September. Excepting June, 1876, which produced 12.11 inches of rain, it was the rainyest month of any name upon our seventeen years record. There were two days in this month which registered over three inches of rain, there having previously been but five such days in the entire period of our observation.

LIEUTENANT JOHN P. FINLEY, who will be remembered by our citizens on account of his tornado investigations in this region of the country, and his articles on the same subject in the REVIEW, is now stationed at Fort Myer, Virginia, where, with the aid of four assistants, he is vigorously prosecuting his scientific observations and experiments in the same direction. Lieutenant Finley has fairly earned his promotion by hard and meritorious work, which has also been otherwise recognized by his having had conferred upon him the degree of "Master of Science," by the Michigan State College; "Fellow by Courtesy," by Johns Hopkins University, and election to permanent membership in the Meteorological Society of France.

DR. A. A. HOLCOMBE, State Veterinary Surgeon of Kansas, has written a special report upon the nature, cause, prevention, and treatment of hog-cholera, which has been published by the State Board of Agriculture for distribution among the people. Copies can be obtained by addressing Hon. Wm. Sims, Secretary, at Topeka, Kansas.

THE St. Louis Academy of Science and the Missouri Historical Society have finally gained the property which has been so long in litigation and will probably at once erect a building suitable for the purposes of both bodies. The property was donated by the late James H. Lucas, a number of years ago, but the delivery was refused by his heirs on account of delay in complying with the terms of the grantor. Such a gift to the Kansas City Academy of Science from one of our wealthy citizens would not only be highly appreciated, but would meet with a prompt response from its members.

THE International Congress convened at Washington, October 1st, to confer with regard to the establishment of a standard prime meridian for the world, was organized by the election of Admiral Rogers, of the U. S. Navy, as President; Mr. W. E. Peddrick, Secretary, and Professor Jansen, of France, General Strachey, of England, and Dr. Luis Cruls, of Brazil, Scientific Secretaries. The meridian of Greenwich seemed to be favored by the majority of the nations represented, and was finally adopted. At present, England and the United States use the Greenwich meridian, Spain uses that of Madrid, Portugal that of Lisbon, France that of Paris, and Russia that of St. Petersburg.

PROFESSOR E. B. TYLOR, president of the anthropological section of the British Association, and Professor H. N. Mosely, president of the biological section, of England, who attended the session of the British Association, at Montreal, as well as our own Philadelphia meeting, accompanied by Professor G. K. Gilbert, of the United States Geological Survey, passed through the city last month on their return to England from a visit to the Zunis, Navajoes and other tribes of New Mexico. Professor Tylor expressed great satisfaction at the result of the visit. He said he had found the Zunis to have retained in a remarkable degree, the customs and religion of their ancestors, while the Navajoes had been much altered by contact with the white race. Professor Tylor and Professor Moseley are both fellows of the Royal Geographical Society.

THE first meeting of the Kansas City Academy of Science for the winter session of 1884 and 1885 will be held at the rooms of the Young Men's Christian Association, on Friday, November 7th, at 7:30 P. M. The opening address will be delivered by the President Col. R. T. Van Horn.

THE monument of Fresnel, at Broglie, France, recently inaugurated, is of very simple design—a stand of worked stone supporting the bronze bust of the philosopher. A tablet of black marble on the wall above bears the following inscription: "Augustin Fresnel, engineer of bridges and highways, inventor of the lenticular rays, was born in this house on the 10th of May, 1788. The theory of light owed to this rival of Newton the most lofty imaginings and the most useful applications."

A deposit of excellent fire-clay has recently been discovered near Santa Fe, N. M., which is said to be of fine quality and very extensive in amount.

ITEMS FROM PERIODICALS.

Subscribers to the REVIEW *can be furnished through this office with all the best magazines of this Country and Europe, at a discount of from* 15 *to* 20 *per cent off the retail price.*

To any person remitting to us the annual subscription price of any three of the prominent literary or scientific magazines of the United States, we will promptly furnish the same, and the KANSAS CITY REVIEW OF SCIENCE AND INDUSTRY, *besides, without additional cost, for one year.*

THE October *Magazine of American History* is a strong and notable number. Its articles are all readable, and of timely and varied interest. The opening article, Curiosities of Invention—a Chapter of American Industrial History, from the able pen of Charles Barnard of the *Century*, will be read with interest. It is illustrated with some of the best portraits ever published of Whitney, Blanchard, Howe, Lyall, McCormick, Goodyear, and Edison, and with numerous pictures of early inventions. The Nation's First Rebellion (in 1794), by H. C. Cutler, throws new light upon a singular episode in our national history. A second scholarly paper from M. V. Moore, (copied in this month's REVIEW,) Did the Romans Colonize America? completes the list of the most important contributions for the current month.

THE *Popular Science Monthly* for November presents the following table of contents: The Relations between the Mind and the Nervous System, by William A. Hammond, M. D.; German Testimony on the Classics Question, by Frederick A. Fernald; Origin of the Synthetic Philosophy, by Herbert Spencer; The Future of the Negro in the South, by J. B. Craighead; Pending Problems of Astronomy, by Prof. C. A. Young; Drowning the Torrents in Vegetation, by S. W. Powell; What is Electricity? by Prof. John Trowbridge; Chilian Volcanoes—Active and Extinct, by Dr. Karl Ochsenius; The Chemistry of Cookery, by W. Mattieu Williams; Domestic Arts in Damaraland, by Rev. C. G. Büttner; Old Customs of Lawlessness, by Herr M. Kulischer; The Oil-Supply of the World.—I; XVI.—Sketch of Prof. James Hall, (With Portrait); Editor's Table: The American Association at Philadelphia; Harrison, Comte, and Spencer; Is the Contrast Valid? Literary Notices. Popular Miscellany. Notes.

WE find the following appreciative notice of the REVIEW in the Boston *Journal of Education* for September 15, 1884: "The KANSAS CITY REVIEW OF SCIENCE AND INDUSTRY is a strictly popular magazine, better adapted to family reading than any other scientific journal in the country. It comprises original articles by the best writers, and selections from the best periodicals of this country and Europe, upon geology, mining, archæology, medicine and hygiene, meteorology, exploration and travels, mechanic arts, history and biography, book reviews, etc."

WE have before referred to *The Dial*, published by Jansen, McClurg & Co., Chicago, as the best journal of its kind (literary review) published in the West. After nearly four years acquaintance with it we are enabled to speak in still stronger terms of its excellence. No journal of the kind in the whole country excels it as a purely literary review. Its leading feature is the presentation of the carefully formed conclusions of special students of subjects treated on books,

which, by this method of reviewing, often serve as the text of critical and instructive essays, while the opinions expressed carry with them the full responsibility of their authors' names. To this leading feature of *The Dial*, others are added, consisting of minor book reviews, notes and comments on interesting literary events, and several full departments of bibliography, which widen its scope and enlarge its usefulness as a literary guide and a record of literary progress. $1.50 per annum.

A cable message was received by the *Science Observer*, Boston, on the 25th of September, at Harvard College Observatory, from Dr. Krueger, Kiel, announcing the discovery of a planet by Palisa, at Vienna. The position given is the following: September 22.5379, Gr. M. T. R. A. 2h. 19m. 3.3s. Decl. +14° 42′ 33″. Daily motion in R. A. —24s., in Decl. —5′. Thirteenth magnitude.

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